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CMR MARKET INDEX

CHEMICAL MARKETING REPORTER's market index of chemicals and related materials (100=1974 average), based on 97 key commercial chemicals, appears alongside with data for two weeks ago, last month and last year.

Chemical Prices Start on Page 38

CHEMICAL MARKETING CUES

PET: Recycled PET material is seen growing 10 percent per year.
SULFURIC: Producer launches Midwest price hike.
ETHANOLAMINES: Surfactants plus temper gas minus.
GLYCINE: Prices should continue the firm trend this year.

Chemical Marketing Reporter

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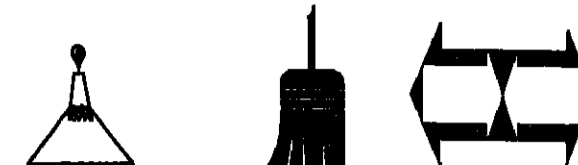
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WASTE MANAGEMENT '86



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WHEN IT COMES TO VITAMIN C, THE EXTRAS COME FROM ROCHE.

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Finland Eyes Export Chemical Trade

Sales of Finnish chemical companies operating abroad rose to an estimated \$1.34 billion last year and the total for 1986 could well exceed \$1.6 billion as some major acquisitions complete their first full year of operation under Finnish management, according to Rauli Nuortila, managing director of Finland's Chemical Industry Federation.

Speaking before a panel session on the internationalization of the Finnish Chemical Congress in Helsinki, Mrs. Nuortila noted that the current figures are in sharp contrast to the total of little more than \$110 million in turnover of Finnish-owned chemical companies operating abroad only five years ago.

Behind the sharp increases are important acquisitions during the past two years by the major state-owned groups, Kemira and Neste, but also the growing

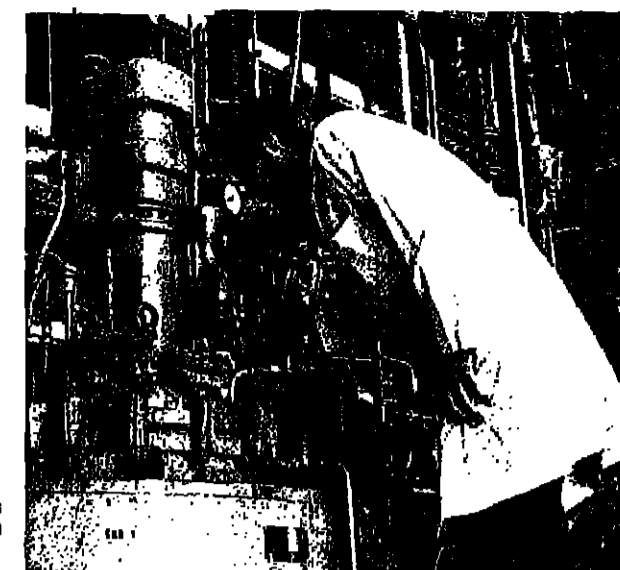
realization on the part of Finnish chemical companies across the board that international markets are likely to be their only basis for sustained, profitable growth, given the small and highly competitive domestic market.

Mrs. Nuortila says the estimated 24 percent share of chemical companies in turnover abroad last year represents an increase from 17 percent in 1984, the last year for which official statistics are available, and compares with 32 percent of the total garnered by the metal and engineering industries and 30 percent by the forest products industries in that year.

For the future, she sees a continued trend toward

Continued on Page 16

KEMIRA RESEARCH: Kemira Oy pilot plant at the company's Espoo research center near Helsinki develops experimental data for both organic and inorganic processes.



Standard Oil Chemical Signs For Butanediol Know-How

Standard Oil Chemical Company has signed an exclusive agreement to obtain technology from Davy Corporation for production of 1,4-butanediol, gamma-butyrolactone and tetrahydrofuran from maleic anhydride.

Davy's new low-pressure ester hydrogenation process, derived from earlier collaboration with Union Carbide Corporation, would use a maleic anhydride feedstock produced by Standard Oil's proprietary fluid-bed normal butane oxidation technology and the aqueous recovery and purification technology of UCB of Belgium.

Integration of the technologies is expected to provide significant cost savings in producing the chemicals, including more efficient energy use, byproduct utilization, waste treatment and materials handling, according to Douglas Campbell, Standard Oil Chemical president.

Process integration, optimization studies and engineering are underway at Davy's Lakeland, Fla., and London, UK, offices. The proposed Standard Oil integrated facility, to be built by Davy, would have annual maleic anhydride capacity of about 200 million pounds annually.

A spokesman says that as a long-term goal it's anticipated approximately 40 to 50 percent of the maleic would go directly to the maleic market and 50 to 60 percent into production of the derivative chemicals. However, the process is extremely flexible, he says.

The Davy process is an offshoot of the low-pressure ester alcohol process developed by Davy with Union Carbide and Johnson

Matthey. That technology is still very much alive and Davy has contracted most recently for alcohol plants in Poland and the Peoples Republic of China, adding to a dozen others that have been built around the world.

Carbide said last December that it would enter the butanediol market using maleic anhydride technology, but planned to purchase its maleic feedstock.

Trade consensus has been that such a project would not fly, since it is maintained that MA has to be part of the product integration, both from an economic and process balance standpoint.

A Carbide spokesman said last week that the company "has no plans to enter the (butanediol) market at present." Further, the company recently signed a long-term acetylene supply agreement with GAF Corporation. GAF, along with E. I. du Pont de Nemours & Co. and BASF Corporation, are the current domestic producers of butanediol.

While admitting that the maleic anhydride technology "looks interesting," BASF for one expects the acetylene-based process to remain the most attractive route well into the next decade.

Joseph F. Daly, manager of marketing research for the company's chemicals division, told a Chemical Marketing Research Association meeting in New York earlier this year that "even if a maleic anhydride-based process is commercialized, we still expect Reppe chemistry to remain the lowest cost route."

Standard Oil Chemical's Campbell says the agreement with Davy gives his company an opportunity to enter new markets with

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Carbide Sells Agricultural Unit To Rhone-Poulenc for Cash

Rhone-Poulenc, the French-based worldwide chemical giant with sales of \$8 billion has reached an agreement to acquire, through its US affiliate Rhone-Poulenc, Inc., Union Carbide's agricultural products company. The price to be paid is \$450 million in cash.

This acquisition includes the worldwide personnel, products, manufacturing and research facilities. The closing is scheduled for the end of this year.

It's been estimated that the business being acquired by Rhone-Poulenc earns around \$40 million a year, although a shutdown at Insti-ene earlier this year probably reduced that. Carbide closed the plant there for a period to make repairs, following an OSHA inspection that found deficiencies and resulted in a fine.

The company, which has a policy of not reporting specific earnings figures, said the division "is indeed a profitable business with good prospects for growth."

It's expected that the company will use the proceeds of the sale to reduce the big debt it

incurred in fending off GAF's unsolicited tender offer.

The acquisition of Carbide's agricultural operation by Rhone-Poulenc fits in with a trend of European companies acquiring US chemical businesses. A recent major example of this was Hoechst's announcement that it will acquire Celanese.

According to Thomas M. Dille, group vice-president for Rhone-Poulenc agricultural sector, "This acquisition reflects a key strategic objective of the RP Group to enhance its position in the US crop protection and plant improvement industry."

"Over the last six years we've made a commitment to growth in the US. First with the 1981 acquisition of Mobil Chemical Company's agrochemical business. More recently by our new product introductions and market expansions of proprietary herbicides and fungicides. And now with this acquisition the diversification of the product portfolio through addition of proven insecticides and plant growth regulators will help balance Rhone-Poulenc Agrochimie's strength in herbicides."

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Sodium Tripoly Gets Boost from Powders

Sodium tripolyphosphate makers are of the belief that the product's steep demand decline of the past five years has ended. In fact, this year's consumption is so far exceeding last year's. Few are optimistic enough, however, to expect any demand increases through the balance of the decade and many would not be surprised by a slight decline.

This year's healthy consumption levels are welcomed by producers, who were forced to decrease production by 10 percent in 1985 as compared to 1984.

The 1985 decline came mostly as a result of the significant growth of non-phosphate containing liquid laundry detergents, which followed heavy advertising and promotional campaigns on the part of retailers. "Detergent producers were literally giving it away," observes Jim Huggins, product manager at Monsanto Company.

Also affecting consumption last year was preparation for late-1985 phosphate detergent bans in Maryland and Washington, D.C., and the reformulation of some dishwasher soaps, especially "Cascade", with reduced phosphate levels.

"This year, though," according to Mike DeCola, phosphorus product manager at FMC Corporation, "powders are getting the attention." Mr. DeCola believes 1986 STPP consumption will actually be up by 5,000 to 6,000 tons over last year.

Observers say the current powder attention has its roots in last year's slow but steady introduction of "Surf" home laundry detergent by Lever Brothers. Now, the advertising emphasis for other detergent makers such as Procter & Gamble and Colgate is also said to be turning more toward powder lines.

In addition, new product introductions on the powder front may prove to boost tripoly consumption. Notable detergents now being test marketed are P&G's "Tide Multi-Action Sheets", Clorox's "Act", and a new "Wisk" powder from Lever Brothers.

Also, producers say that in phosphate-allowed areas, branded products with higher phosphate content have been taking market share from lower strength generics.

Making the most common in the detergent world these days is P&G's "New Science

"Tide" which is currently in its second phase of marketing in Florida. The product features a built-in organic perborate bleach.

Any success for the product would likely be a wash for STPP, however. Mr. DeCola at FMC notes that "New Science Tide's" phosphate content is lower than traditional "Tide's" by about 6 percent, but that acceptance by consumers would likely be at the expense of some non-phosphate liquids market share.

All in all, however, this year's rally may be, as one producer put it, "something of a blip in the overall picture." Even with the powder advertising activity, liquid laundry detergent encroachment has continued in 1986, albeit at a slower pace. One producer says the liquid share of the detergent market

Continued on Page 43



P&G's "Tide" products are making a comeback in the detergent world these days. "New Science Tide" is currently in its second phase of marketing in Florida.

John C. L. 16

Water Act Veto Drawing Fire Of Lawmakers, Environmentalists

Critics say President Reagan "is turning his back on all Americans" by vetoing an \$18 billion plan to curb pollution of the nation's waterways, and the new Democratic-led Congress plans to send similar legislation back to the White House soon after it convenes in January. President Reagan vetoed the Clean Water Act amendments on grounds they were too costly, just hours before a November 6 midnight deadline for action on the bill and comfortably after the 1986 elections.

"Unfortunately, this bill so far exceeds acceptable levels of intended budgetary commitments that I must withhold my approval," President Reagan said in his veto message.

Lawmakers and environmentalists, who had urged him in a series of news conferences to sign the legislation, responded immediately.

"By refusing to sign this enormously popular environmental health bill, Reagan is turning his back on all Americans," said Michael McCloskey, chairman of the Sierra Club. "It seems that the President considers saving dollars more important than saving lives."

"It is astounding that the President would veto legislation that is at the top of the public's agenda," added Sharon Newsome, director of legislative affairs for the National Wildlife Federation. "Now all Americans will have to wait for cleaner water."

Consumer advocate Ralph Nader said President Reagan "has broken faith with the American people not only by vetoing the clean water bill but by waiting until just after the election so the American people would not have a chance to register their judgement at the polls."

Both the Democratic-led House and the Republican-led Senate had voted unanimously.

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Halcon Signs Pact With Nobel Affiliate

Nobel Chemtur AB, Karlskoga Sweden has signed an agreement with the Halcon SD Group, for exclusive worldwide right to license Halcon's ethylene-from-ethanol technology.

Under the arrangement, Nobel Chemtur will assume responsibility for marketing, but will be fully supported by Halcon SD while assimilating the technology.

Halcon's subsidiary Halcon Catalyst Industries will continue to market and manufacture its proprietary "SymDol" catalyst utilized in the process. Halcon will retain the exclusive rights to license technology for the production of ethylene oxides and ethylene glycols from ethanol.

Nobel Chemtur, a company in the group Nobel Industries Sweden, is engaged in chemical engineering and supply of plants and technologies for ethanol and ethanol derivatives, explosives, pharmaceuticals and environmental protection.

EPA Cancels Carbon Tet

Environmental Protection Agency has issued a notice canceling all pesticide products containing carbon tetrachloride, with the exception of a single registration for use on encased museum specimens.

Carbon tetrachloride is currently registered in a number of products used as fumigants to control insects in stored grain, in flour milling and grain processing plants, as well as museum specimens.

EPA says its action is based on evidence that carbon tet poses cancer risks and adverse effects to the central nervous system, liver and kidneys.

The registration, sale and distribution of the pesticide for grain fumigation has been suspended since December 31, 1985. Leftover stocks were used until last July. Carbon tet has been on the market since 1948.

From 1981 through 1984, 23.8 to 27.7 million pounds of the chemical were used on approximately 740 million to 870 million bushels of stored grain on and off the farm, according to the agency.

US, Mexico Reach Accord on Wastes

The US and Mexico say they have reached an agreement on the trans-boundary movement of hazardous waste and toxic substances. The bilateral pact provides for notification and, in the case of hazardous waste, prior written consent from a receiving nation to a proposed export, and for cooperation in returning improperly shipped materials.

According to the agreement signed last week by Environmental Protection Agency administrator Lee Thomas and Mexican secretary of urban development and ecology Manuel Camacho-Solis, the two nations pledged to begin formal negotiations on a strategy to control air pollution caused by copper smelters on both sides of the border.

The environmental chiefs also discussed Mexico's progress in resolving water pollution problems in the San Diego-Tijuana border area and in the New River.

Both sides reaffirmed commitment to the principles outlined in the Presidential Border Environmental Agreement of 1983.

Airco Set to Open Air Separation Plant

A new 1,000-ton-per-day gas liquefaction unit, the largest of its kind ever built in the US, goes on-stream December 31, 1986 when Airco opens its new Springfield, Ind., air separation facility.

Located mid-way between Chicago and South Bend, the plant will supply liquid nitrogen, liquid oxygen and liquid argon to the chemical, heat treating, steel, food, and plastics industries in the four-state area surrounding the facility.

To ensure a reliable supply of high-quality product, Airco installed a storage system capable of holding a ten day supply of liquid product.

The new plant incorporates the latest technology for automated loading, product analysis and pollution control. Airco's proprietary "Sentry System" measures gas purity to within 0.1 part per million and automatically fills trailers to the legal limit.

BioTechnica R&D To Be Continued

BioTechnica International, Inc. reported it received notice from EniChem Agricoltura S.p.A. that Italian firm will terminate its collaborative research agreement to genetically engineer *Rhizobium* bacteria for use as soybean seed inocula. After EniChem's funding of the research project ends in April 1987, BioTechnica plans to continue the project although the Company may seek funding from a new corporate collaborator.

Norman A. Jacobs, BioTechnica's president and chief operating officer says, "BioTechnica initiated this research program in 1983, and the technology rights will remain with BioTechnica. We have developed improved *Rhizobium* strains which show promising greenhouse results, and the company plans to apply for approval to conduct initial field tests in 1987 to corroborate these data. Although the loss of this contract may adversely impact our 1987 revenue, BioTechnica has regained commercial rights to a key project in our agricultural biotechnology program."

Mr. Jacobs added, "EniChem took over this research program from Unifroyl, Inc. in April 1986, during the period when it was considering the purchase of the Unifroyl agricultural chemical business. EniChem subsequently decided not to make an offer for the Unifroyl business."



Steven W. Scheefer, who has been appointed executive vice-president for plastics and polymers by Occidental Chemical Corporation. The company says the appointment reflects his increased responsibilities following the acquisition of Tenneco Polymers, Inc.

Industrial Gas Firms Are Acquired by UGI

UGI Corp., says that its AmeriGas subsidiary has acquired related industrial gases distributors, based in Oakland, Calif., for an undisclosed amount of cash.

AmeriGas purchased the assets of closely held Pacific Oxygen Co. and Pacific Oxygen Sales Co. whose combined annual sales are approximately \$5.4 million.

The two companies distribute oxygen, nitrogen, argon and other industrial gases, as well as welding supplies, from Oakland, San Leandro, San Francisco and City of Industry (Los Angeles).

Edwin A. Wilcox, vice-president of UGI and president of AmeriGas Industrial Gases, said the acquisitions will "strengthen existing AmeriGas markets in California and provide a base load for our new air separation plant that is being built in Sacramento."

Mr. Wilcox said operations of the firms will be merged into the Pacific Region of the AmeriGas Industrial Gases Division, which has 26 distribution locations in California.

Bioassay to Sell Toxicology Labs

Bioassay Systems Corporation says it will sell its toxicology facility in Woburn, Mass. to US Biogenetics, Inc. US Biogenetics will pay \$250,000 for Bioassay's interest in its lease and for certain laboratory equipment at Woburn. Bioassay will retain all other financial assets and liabilities related to the Woburn operation.

The company also expects to sell its toxicology facility in Decatur, Ill. by mid-December to a separate purchaser. The sales would be subject to shareholder approval. Bioassay, which has been considering redeployment of its assets since the beginning of 1986, says "unfavorable climate in the toxicology market" led to fewer studies being placed with its operating subsidiaries and losses in the business.

The company has also agreed to sell its interest in IRE-Medgeniz SA, a joint venture established in 1985 to market and sell diagnostic products in Europe.

S&W Gets Contract For Ethylene Unit

Stone & Webster Engineering Corporation will supply technology and basic engineering and design services for the 450,000-metric-ton-a-year ethylene plant to be built for Formosa Plastics Corporation near Linyuan on Taiwan's southeastern coast. A fast-track schedule calls for completion in early 1989. The olefins unit, which will use Stone & Webster's USC (ultraselective conversion) process, will supply ethylene and propylene to downstream manufacturing facilities.

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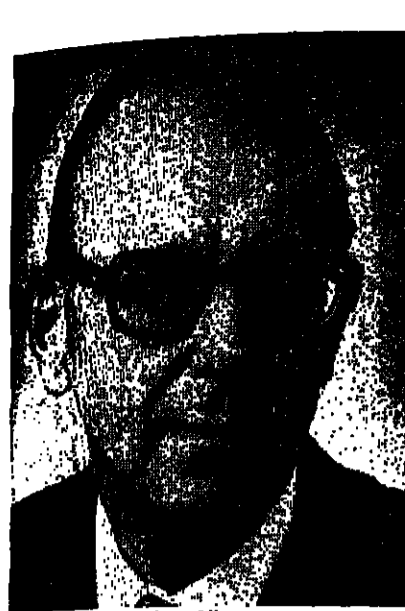
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Dr. Hans Albers

Butadiene: Have Prices Hit Bottom?

Butadiene inventories have registered a steep decline in recent months, and sources say butadiene exchanges (lending and borrowing) are hard to come by on the Gulf Coast.

These developments have been caused by a sharp drop in butadiene imports this year, leading sources to speculate that butadiene prices have finally hit bottom.

The bottom for butadiene bought on the US Gulf Coast is 9 cents per pound. Sources say prices aren't expected to firm in the near term since demand is soft. But it appears European exporters of butadiene have watched the price sink low enough, and are now reluctant to ship product to the US at prevailing prices.

Instead, a growing number of European ethylene producers are re-routing the crude C4 streams produced in the ethylene crackers (minus isobutylene) back into the olefin plants where the streams are co-cracked with fresh feedstocks. Eugene J. Debrezeni, a member of De Witt Consulting Group, Houston, Tex., says 10 or 11 crackers in Europe are currently co-cracking a portion of

Continued on Page 19

Supreme Court Refuses to Hear Appeal by Ortho

The Supreme Court last week upheld a lower court's decision to award \$4.7 million to a couple who blamed a drug company's birth control product for their child's multiple birth defects.

The justices refused to hear an appeal by Ortho Pharmaceutical Corporation, which argued there is no scientific evidence linking its "Ortho-Gynol" contraceptive jelly with abnormal development of fetuses.

The damage award is believed by industry analysts to be greater than the company's yearly profits from its spermicide products, which are used by more than 3 million women.

Observers expressed concern that the large award, combined with what they claim was a lack of evidence in the case, could deepen the liability crisis in the pharmaceutical industry and prompt discontinuation of some products.

However, an Ortho spokesman says the company does not plan to take the birth control product off the market and the ruling will not have any financial impact. He says "less than a handful" of similar suits are pending against the company in other courts.

In July 1985, US district court judge Marvin Shoob of Georgia ruled that Ortho Pharmaceutical, a subsidiary of Johnson & Johnson, was liable for various physical

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German Chemicals Slipped During '86; US Dollar, Oil Blamed

The German chemical industry's product prices dropped an average 5 percent during the year now ending, Hans Albers chairman of BASF and president of the German Chemical Industry Association (VCI) told a press conference for the association. Dr. Albers blamed the downhill slide of the dollar and the collapse of crude oil pricing.

"Even good domestic demand was unable to prevent sales of the chemical industry of the Federal Republic of Germany from declining about 6 percent during the first three quarters, according to our estimates," Dr. Albers says. He notes that although exports declined compared to domestic sales, they still account for 52 percent of total sales which increased the effect of the dollar's and oil price decline.

In specific chemical areas, Dr. Albers says that since the beginning of the year, sales of basic organic and inorganic chemicals like ammonia, sulfuric acid, ethylene and methanol have become "less satisfactory" while a further decline for construction related products was stopped.

That wasn't the case for fertilizers, he

says. They suffered from "massive lower-price initiatives," while pesticides were influenced by negative weather conditions.

In the consumer area, sales of household care products and cleaning aids declined, while demand for photographic products rose. Sales of specialty plastics and fibers held at a high level, as they have done of late. Also sales of textile, paper and leather industry products were in general satisfactory," Dr. Albers says.

In contrast progress in pharmaceuticals appears weaker, partly, he says, because of discussion among public health authorities about the need to reduce costs. As in other areas, pharmaceutical exports are "notably reduced," he adds.

As for the future, Dr. Albers expects little major change during the remaining eight weeks of the year, "so, in sum, we probably don't need to be disatisfied with the economic results of this year."

Looking a little further ahead, he expresses confidence that the German chemicals industry's research budgets and investment programs now totalling about 16 billion marks are a "clear signal" that the industry

Continued on Page 26

Albers Vs. Environmentalists

Responding to assertions from the left that more environmental controls should be placed on the German chemical industry, Dr. Albers says the industry already spends 1.1 million marks every day to protect the environment and has voluntarily taken a number of measures to this end.

"In the last twenty years emissions of chemicals have fallen about 60 percent, while during the same period production has increased by over 150 percent," he declares.

"We are the first German — and so far as I know — the first European industry branch to give itself guidelines on environmental protection," he says.

As an example of the industry's environmental self-regulation he said it recently voluntarily agreed with the Fed-

eral Environmental Ministry to reduce its use of polybrominated diphenyl ether as a flame retardant. Other voluntary agreements cover soap and detergent materials and an agreement to reduce ammonium content in waste water.

A pending agreement will cover a reduction of halogenated hydrocarbons.

Dr. Albers said the new "chemical politics" of the industry's critics in Germany are based on "principles of mistrust."

"That people and the environment are increasingly endangered by the operations of chemical production."

"That existing legal regulations are completely insufficient."

"That further laws and taxes are needed, to hinder or avoid the threat to society and the environment."

Fertilizer Shipments Mixed; Exports Bolster the Market

Domestic disappearance of fertilizer products was 2 percent lower in September 1986 compared to September 1985, according to the Fertilizer Institute.

Shipments of nitrogen and phosphate products declined 4 percent, while potash movement rose 5 percent. For the year-to-date comparisons, disappearance was 1 percent below the July to September 1985 level for all products, while nitrogen was unchanged and phosphates rose 3 percent. US potash shipments for the period were 6 percent below those of 1985.

Production of all fertilizers in September was 8 percent below September 1985, while year-to-date production was off 13 percent compared to last year. For the month, increases in production of phosphates (up 7 percent) and potash (6 percent) were offset by a 12-percent fall in nitrogen and a 29-percent drop in mixed fertilizer production.

Ending inventories in September were slightly lower than September 1985, dropping only 1 percent. Nitrogen inventories were unchanged, while phosphate and US potash inventories declined 4 percent and 3 percent, respectively.

For the second consecutive month, exports of all fertilizer materials rose more than 4 percent compared to the same period last year. Increases came in ammonium nitrate, ammonium sulfate, concentrated superphos-

phate, diammonium phosphate, potassium muriate and potassium sulfate.

Overall imports rose nearly 12 percent compared to the same period in 1985, led by nitrogen solutions, urea, and potash products.

Domestic disappearance of solid urea rose 108 percent in September compared to September 1985, and was up 75 percent for the period. Of the remaining nitrogen products, only liquid urea showed an increase for the month and year-to-date comparisons.

Nitrogen solutions disappearance fell 33 percent compared to September 1985. Anhydrous ammonia shipments lagged year-age levels for the month by 4 percent.

Nitrogen production dropped 12 percent for the month and 15 percent for the year-to-date comparisons. Solutions production was reduced by 38 percent from September 1985 levels, while solid urea production jumped 18 percent.

Ending inventories of all nitrogen products showed no change from year-age levels, but anhydrous ammonia stocks grew by 22 percent, nitrogen solutions by 1 percent and liquid ammonium nitrate by 24 percent.

Solid ammonium nitrate and ammonium sulfate inventories each fell 36 percent, while liquid urea stocks dropped 95 percent and

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CSMA Slams OSHA Rule In Comments

Chemical Specialties Manufacturers Association is expressing concern over a proposal by Occupational Safety & Health Administration to set a mandatory standard for the protection of laboratory workers dealing with toxic chemicals.

In comments filed with the agency on its proposed uniform standard for all laboratory workers, the chemical group urges OSHA to issue the proposed rule only as a voluntary standard for at least those laboratories in the industrial or manufacturing sector, currently covered by the Federal hazard communication standard.

CSMA says OSHA has failed to demonstrate a need for a final standard and points out that most industrial laboratories already have programs with precautionary measures similar to those required by the proposed standard to reduce toxic substance exposure to workers.

REGULATORY BURDEN

"A mandatory standard in this area will only become an additional regulatory burden resulting in needless expense and rigidity on the regulated community," says CSMA.

The trade association also notes that the Reagan Administration has failed to demonstrate a manifest risk of injury or illness in industrial laboratories that would be reduced by the proposed standard.

In addition, CSMA questions the economic cost and regulatory burdens the proposed standard would place on small business as well as the manner in which it would be implemented and enforced by OSHA.

"It is our viewpoint that it would be an exceeding drain on manpower and productivity if facilities are required to have written standard operating procedures on every activity that is or could be taking place in a laboratory," the trade group says.

If OSHA decides a voluntary guideline approach is insufficient and issues the proposed standard, CSMA urges the agency to exempt laboratories that are covered by the hazardous communication standard from the proposed new standard.

Rohm & Haas Agrees to Sell Chemical Plant

Rohm and Haas Company has agreed to sell a California chemical plant it purchased in 1984 from Diamond Shamrock Corporation in order to settle a Federal antitrust complaint.

The Justice Department filed an antitrust suit against Rohm and Haas in US district court, challenging the acquisition of Duolite International Inc. on the grounds that it reduced competition for a specialty product used in water treatment equipment.

The government contends that the purchase of Duolite's California plant gave Rohm and Haas more than a 50 percent share of the \$112 million annual US market for ion exchange resins. As a consequence, the government says the acquisition is likely to "substantially lessen competition" in the resin market.

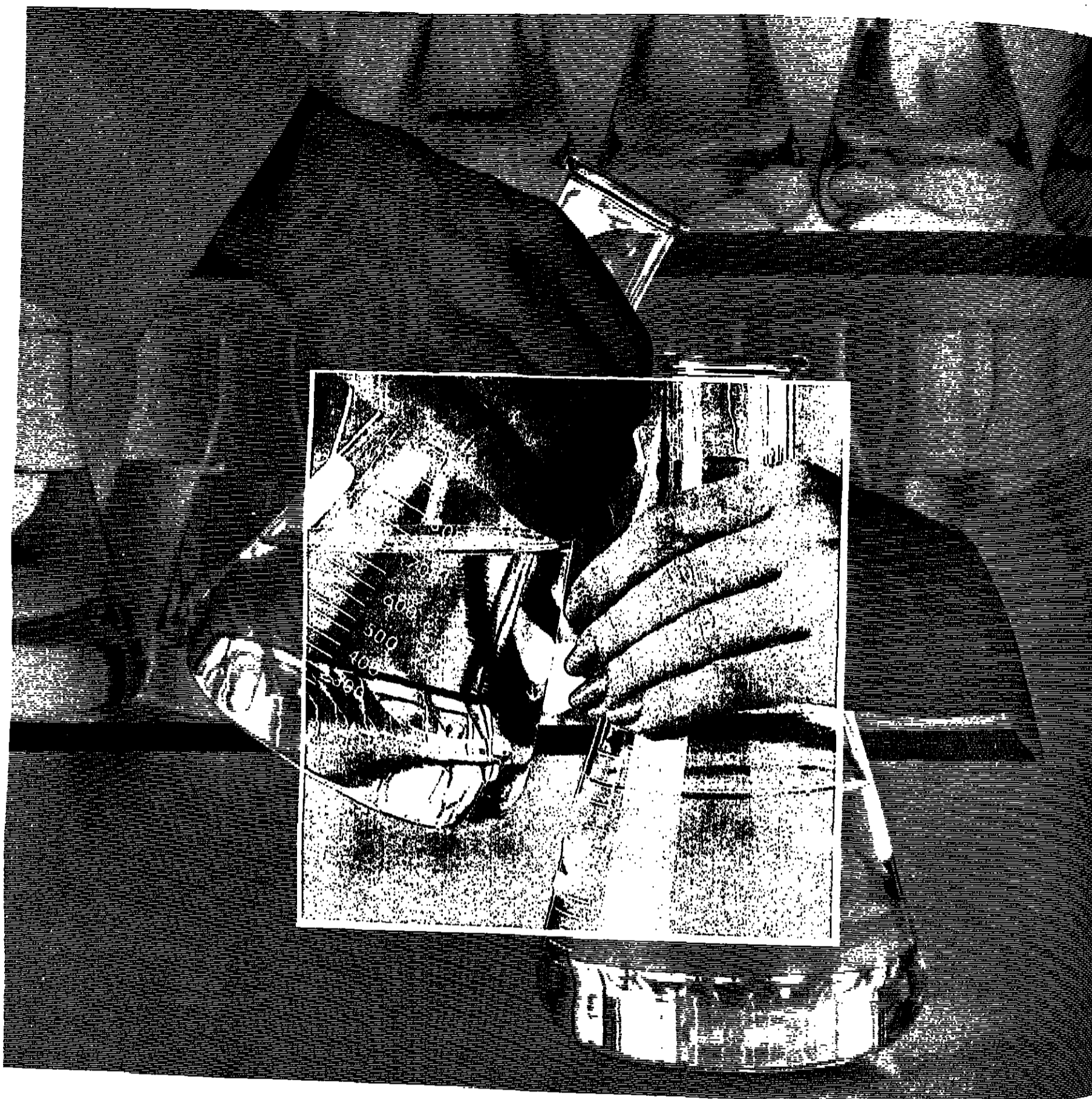
The antitrust suit is one of only a handful filed by the Justice Department during the Reagan Administration.

In 1983, Rohm and Haas was the top US producer of ion exchange resins with a 35 percent share of US sales. Duolite ranked third with a 16 percent share.

The \$45 million purchase from Diamond Shamrock also gave Rohm and Haas Duolite's assets in France plus the firm's plant in Wales. Altogether, Duolite ranked second in worldwide sales behind Rohm and Haas.

In court documents, Justice says that as a result of the acquisition, "actual and poten-

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The Little Chemical Giant



GRACE PICKS EXECUTIVES: J.P. Bolduc, Terrence D. Daniels, and Paul D. Paganucci, who have been elected vice chairman of W.R. Grace & Co. J. Peter Grace, chairman, chief executive officer and president, said the appointments "will ensure an orderly transition for our company's management."

Phelps Dodge Will Buy Carbon Black Producer

Phelps Dodge Corporation, the largest copper producer in the US, has agreed to purchase Columbian Chemicals Company, a major producer of carbon black, as part of a corporate diversification plan, the company announced last week.

Financing for the acquisition, which should be completed by December, pending approval of Phelps Dodge's board of directors, is being arranged by Morgan Guaranty Trust Company.

Carbon black pigment is used primarily in rubber applications such as automobile tires, as well as industrial applications including plastics, coatings and building products.

G. Robert Durham, president of Phelps Dodge, feels that Columbian Chemicals will be a comfortable fit for the company. Its earnings, less cyclical than copper's, should "help us bridge the deep troughs that affect copper price from time to time," he says, praising Columbian's "able management team, which will continue to manage and develop its business."

Columbian Chemicals, a privately-owned firm based in Atlanta, earned a net profit of \$23.2 million last year on sales of \$305 million. Through September 30 this year, its net earnings totaled \$19.8 million on sales of \$280 million. The company, which also pro-

duces synthetic iron oxides, operates five carbon black plants in the US, and, through its subsidiaries, plants in the UK, Canada, West Germany, Italy and the Philippines.

The company's chairman, Ladislav Von Hoffman, affirms, "Columbian Chemicals is pleased to join the Phelps Dodge group of companies. Our customer relationship should be strengthened by our becoming part of this larger and publicly-owned organization, and our management team looks forward to our new relationship, which I believe will benefit both companies."

The carbon black industry in the US, afflicted by overcapacity and imports, underwent considerable restructuring this year, when Phillips, a leading producer, left the market. Columbian Chemicals acquired Phillips' "Echoblack" plant in Orange, Tex., and its plant in Hanover, West Germany this June. It also took over Phillips' share of a "Sovaco" carbon black production facility in the UK earlier this year.

Phelps Dodge intends to maintain its position in the copper market, Mr. Durham states. In September, the firm announced an agreement to purchase Kennecott Corporation's two-thirds ownership of Chino Mines Company, which operates a large copper mine, mill and smelter and complex in southwestern Mexico. This transaction is also expected to close by the end of this year.

Monoclonal Antibodies Show Promise in Animal Studies

Among the most promising and versatile tools under study in the animal-related research laboratories of the United States are high-tech, disease-fighting proteins called monoclonal antibodies.

Their promise is outlined by Dr. David B. Snyder of the University of Maryland in the 1986 Yearbook of Agriculture, "Research for Tomorrow," released last week by the US Department of Agriculture. Dr. Snyder is assistant professor at the university's Virginia-Maryland College of Veterinary Medicine.

In an article entitled "Improving Animal Health Through Monoclonal Antibodies," Dr. Snyder leaves readers' imagination with such questions as: "Wouldn't it be nice if cattle producers could choose the sex of their next calf? Better yet, what if a veterinarian could successfully locate and destroy tumors in valuable animals without using surgery, irradiation or chemotherapy?"

Other questions he poses deal with identifying diseases exactly and quickly, determining best times to breed, and quickly determining if milk is free from contaminants.

Dr. Snyder expects monoclonal antibodies to bring all of these benefits and others in the relatively near future.

Monoclonal antibodies already are at work fighting economically significant animal dis-

eases such as scours. One corporation awaits government approval to market a monoclonal antibody treatment for pseudorabies in piglets, a herpes-related disease with a high fatality rate.

Monoclonal antibodies get their name from the fact that the cells which produce them are cloned and that they attack only one targeted aspect of an invading organism.

They derive their rainbow of capabilities from their ability to attack and neutralize specific targets within a "forest" of attackers brought in by an invading organism.

For instance, Dr. Snyder writes, monoclonal antibodies could be used as "magic bullets" to seek out and destroy specific invaders anywhere in an animal's body, without the complications and expense of surgery, chemotherapy or irradiation.

With the advent of monoclonal antibodies, a series of very quick and very sensitive tests is surfacing, Dr. Snyder says these will allow a farmer to identify in a very short time exactly which agent has infected his or her poultry flock, replacing tests that now take days or weeks to complete. A corrective therapy or vaccination program can then be applied much faster and economic losses cut sooner.

Carrying this a step further, Dr. Snyder foresees monoclonal antibodies used in the

Continued on Page 36

EPA Draws Praise For Toxics Proposal

A government ban on land disposal of certain hazardous wastes will mean a substantial improvement over past proposals for dealing with toxic contaminants, say environmentalists.

Environmental Protection Agency issued new rules, effective November 8, prohibiting land disposal of dioxins and spent solvents and requiring instead treatment of the substances to reduce their toxicity. Only the less toxic residues will then be permitted to be disposed of on land.

Environmental Defense Fund praised the move as an improvement over an earlier agency proposal, saying the plan "would have made the land ban no ban at all."

But the group criticized a section of the EPA plan that offers exemptions of up to two years in cases in which treatment capacity is not adequate to handle the waste materials.

EPA already has granted extensions for several sub-categories of solvent wastes, most of them wastewaters. The materials covered by exemptions may continue to be disposed of on land until November 8, 1988.

"The new restrictions on the land disposal of solvents and dioxins represent a significant turning point in hazardous waste management," says EPA Administrator Lee Thomas.

"These rules will substantially reduce long-term public health risks by requiring treatment of hazardous wastes to reduce or

eliminate their toxicity before land disposal," he adds.

Solvents are used throughout industry, primarily as degreasing agents. Some of their components have been linked to cancer in laboratory animals.

The regulations are the first in a series of requirements outlined in 1984 amendments

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Lee Thomas

EDB Ban Poses Problem For a Hard-Pressed EPA

Nearly three years after Environmental Protection Agency took emergency action to ban ethylene dibromide from the market, 328,000 gallons of the carcinogenic pesticide remain stored in warehouses across the nation, much of it possibly leaking from corroded drums.

Although the government paid EDB manufacturers \$2.3 million to recall the pesticide it banned in February 1984, EPA officials acknowledge they have not been able to properly dispose of any of it.

At a special congressional oversight hearing in Washington last week, Douglas Camp, EPA's director of pesticide programs, said a number of complications have kept the agency from getting rid of the EDB still stockpiled in 42 states.

He said those complications include developing a workable disposal plan, selecting a contractor, acquiring state and local permits to chemically reprocess the EDB, and the

lengthy time period required to reimburse manufacturers for their recall.

"The suspension of EDB was an emergency action necessary for the protection of the public health, a situation that did not allow for advance planning," Mr. Camp explained to the House government operations subcommittee.

He said the chemical companies paid for recalling the EDB are responsible for its storage, but because of the widespread leakage, EPA may have paid for some empty drums.

Most of the EDB is stored in Kansas, including some 60,000 gallons at an EPA laboratory in Kansas City, Kan. The material was originally held at a Vulcan Chemicals Company warehouse in St. Joseph, Mo., but was moved after EPA inspectors discovered leaking canisters last August.

After 20,000 gallons of the pesticide reached Kansas City, the city council voted to

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Scientists Are in a Flap Over Biotech Field Testing

Scientists from the National Science Foundation participated last Summer in field-testing a genetically-engineered rabies vaccine in Argentina without seeking approval from the Argentine or US governments, it was reported last week.

The Argentine government learned about the test in September and barred any further experimentation.

US officials and scientists said the test, in which 20 cows were inoculated in July with a gene-altered viral vaccine at the agricultural station in Azul, raised questions about the effectiveness of the Reagan Administration's program to regulate the products of biotechnology research.

"I am not bothered by the idea of US research institutes and companies going abroad for their testing," said Dr. David Kingsbury, assistant director of the National Science Foundation, the nation's oldest biomedical research institution.

But Dr. Kingsbury, who coordinated the

development of the Administration's regulatory program, said he was "appalled they did it without the knowledge of that country... Given the volatility and concern on this issue, you just don't do things like that."

Regulations signed by President Reagan in June do not prohibit US companies or research laboratories from testing genetically altered products in other countries.

The vaccine, according to Dr. Hilary Koprowski, director of the Wistar Institute in Philadelphia, has been under development since 1983.

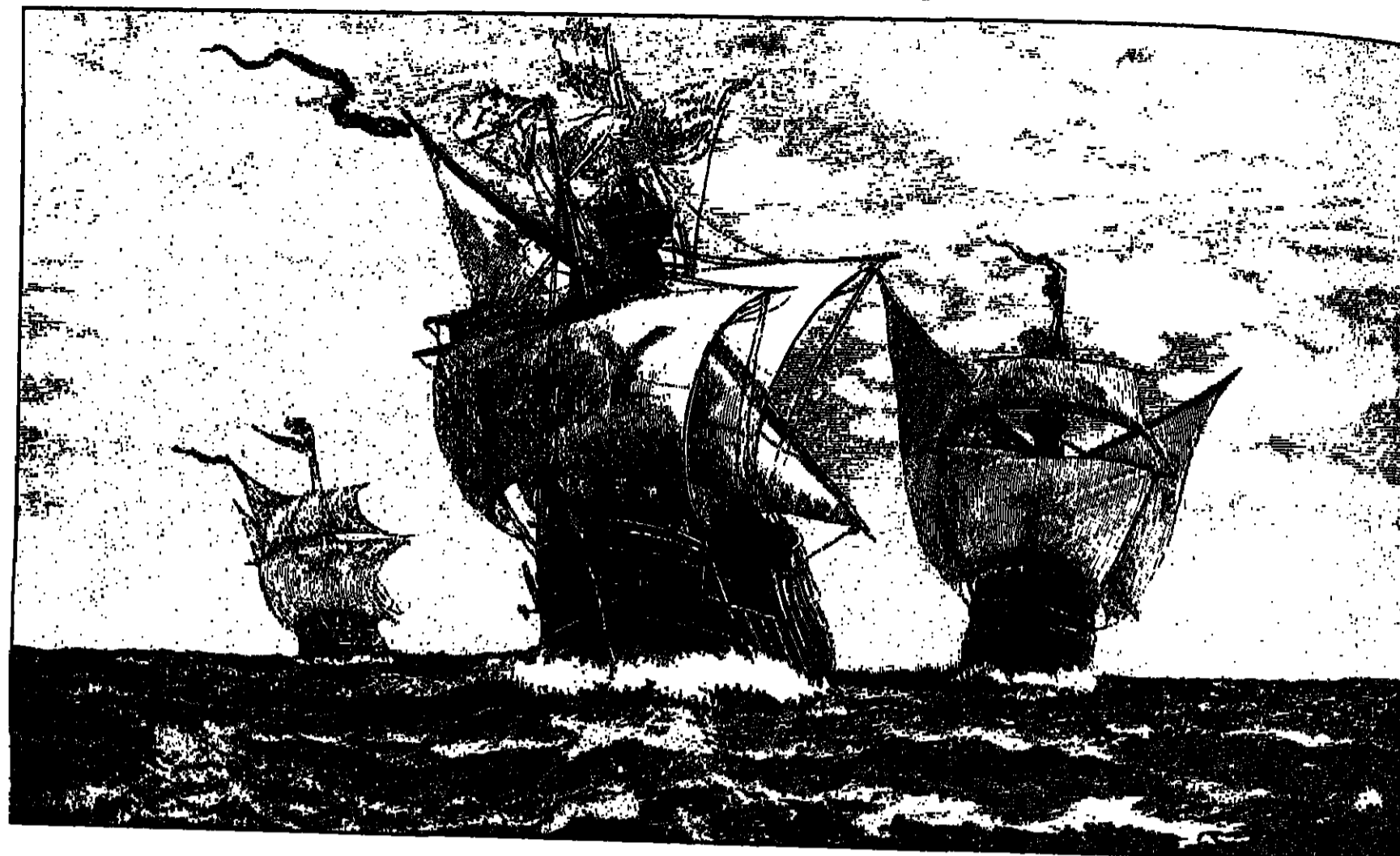
Researchers at the institute spliced the single rabies gene into vaccinia, a common virus that has long been used to produce vaccines, including the smallpox vaccine.

"We have a lot of experience with this kind of vaccine," said Dr. Koprowski. "It was not my business to bring this to the Argentine government. It is my understanding that experiments done on the premises of the United Nations are under the responsibility of the

Continued on Page 46

John C. 116

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Secondary-butyl Chloroformate
Ethyl Chloroformate
Pivaloyl Chloride

Carbonyl Diimidazole
Diisopropylethylamine
N-(Benzyloxycarbonyloxy)-succinimide
Amino Acid NCA's (N-Carboxyanhydrides)
Dipeptides



News Capsule

Univar Gets McKesson

Univar Corporation has completed the purchase of McKesson Chemical Company. Univar will merge San Francisco-based McKesson with Van Waters & Rogers Inc., Univar's domestic chemical distribution subsidiary, based in San Mateo, Calif. Univar says the acquisition makes it the largest chemical distributor in North America.

Church & Dwight Buys

Church & Dwight Company Inc. has completed the acquisition of National Vitamin Products Company of Minneapolis. National Vitamin produces milk-based products for the dairy herd replacement, veal, swine, horse and specialty markets and has plants in Minneapolis and Elmira, N.Y.

Biotechnica Wins Patent

Biotechnica International Inc., Cambridge, Mass., says it has been awarded a patent for a novel method for the purification of phenylalanine, a major component of the artificial sweetener, aspartame. Corresponding patents covering the company's process are pending in other countries.

Cal Biotech Forms

California Biotechnology Inc. has formed a new international subsidiary, California Biotechnology International, to direct and implement the company's expansion outside the US. The first entity of the subsidiary will be Pacific Biotechnology Pty., a joint venture in Australia.

Shell Starts BPA Project

Shell Nederland BV has started construction work at its Pernis site near Rotterdam, for a \$60 million modification of its bisphenol-A plant there. First part of the project, which will enable the company to produce bisphenol "F" (diphenyl methane) and epoxy resins based on it, is expected to be completed by the middle of 1987. The total project is expected to stream toward the end of 1988.

Mobil Sets Hydrotreater

Mobil Oil Corporation has awarded contracts for construction of a hydrotreater to cut sulfur emissions at its refinery in Torrance, Calif. Construction, scheduled to begin late this year toward completion by late 1988, includes the hydrotreater, a hydrogen plant and a sulfur recovery unit. The entire project will cost over \$200 million. Ralph M. Parsons Company will work on modification of existing refinery units and M.W. Kellogg Company will build the hydrotreater.

UCC Sells Business

Union Carbide will sell the assets of its electrical carbon business to the UK's Morgan Crucible Company for \$25 million in cash. Carbide says the transaction will have no material effect on earnings. The graphite electrodes business and other carbon-based products sold by UCC's carbon products business group are unaffected by the sale.

Goodyear Acquires

Goodyear Tire & Rubber Company will transfer the technology of its newly acquired subsidiary, Howdins, Ltd., in Britain to Goodyear technical centers in Luxembourg and in its Akron, Ohio, headquarters, and will end Howdins' operations in the UK. Goodyear still has about a week and a half to come up with a restructuring plan satisfactory to Sir James Goldsmith, the financier who is threatening to take over the company.



John G. Harron, who has been named president of SunOlin Chemical Company, Claymont, Del. SunOlin is a joint venture of Sun Company and Olin Corporation.

Borg-Warner's Financial Unit Put Up for Sale

While Irwin L. Jacobs, an investor based in Minneapolis, Minn., raised his stake in Borg-Warner Corporation to 7.4 percent, or 6,480,000 shares from 6.1 percent, the company pressed ahead with its program to ward off an unwanted acquisition by restructuring itself.

Borg-Warner, a diversified producer of air conditioning equipment and acrylonitrile-butadiene-styrene plastics, said it would put its Financial Services, Inc., subsidiary up for sale.

The financial subsidiary, which does business primarily as Borg-Warner Acceptance Corporation, is the fourteenth largest finance company in the US, according to the *American Banker*. Its net receivables at the end of 1985 totaled \$4 billion.

The key advantage to Borg-Warner in selling off the financial unit is that it will free up

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Vista Chemical's Public Offering Is Firm's First

Vista Chemical Company, the Houston, Tex.-based privately held producer of polyvinyl chloride and detergent chemicals which was once part of the Conoco Incorporated operation of E. I. du Pont de Nemours & Co., is planning to make an initial public offering of 4,448,000 shares of its common stock.

The offering will be made through an underwriting syndicate managed by E. F. Hutton & Co. at a price which is expected to be in the range of \$16 to \$18 per share.

Proceeds will be used to redeem the company's outstanding special preferred stock, to repay indebtedness to be incurred to repurchase 3,706,000 common shares issued upon the exercise of warrants prior to the completion of the offering, and to reduce term indebtedness.

Of the shares to be offered, 3,984,000 will be sold by the company and 464,000 by certain selling shareholders.

Vista, which went private three years ago

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Sandoz Spill in Rhine To Have Many Effects

By the middle of last week a wave of poisonous chemicals spilled from a Sandoz facility at Schweizerhalle (Basel) had moved down the Rhine and into the North Sea, leaving behind some 500,000 dead fish and a political outcry that could very well lead to tougher chemical regulation particularly in Germany. The accident is potentially one of the worst European ecological disasters of recent years.

By the time the mixture of solvents, insecticides, herbicides and other pesticides finally reached Holland it had lost some of its potency. No fish died in the Netherlands, although some smaller fauna were injured.

On Friday, Swiss environmental officials said that the Rhine will need up to ten years to regain its ecological balance. They said it is unlikely that the fish population will be restocked for several years. Thirty-four species will be reintroduced, but according to the authorities the fish population cannot return to its previous level for a decade.

The police, meanwhile, were investigating to determine whether the fire that caused the

spill was the result of a chemical reaction, a short circuit or sabotage, amid reports that the company might have violated Swiss law by, for example, storing chemicals in an area designated for machinery. Firefighters poured thousands of gallons of water per minute on the Sandoz plants and washed the chemicals into the river.

Even as the early effects of the chemical release were slowly abating there is fear of the delayed consequences that tons of mercuric compounds could have on the river. The plume of toxic chemicals was 42 kilometers long.

The major immediate problem is the residue of toxic waste on the river floor.

For the recovery to begin, micro-organisms have to drift into the polluted parts of the Rhine from upstream or tributaries, according to Peter Pette, a Swiss environmental official. After six to ten years this would bring the level of aquatic life back to normal.

One long-term problem is that the toxic chemicals that settled on the river floor or flowed into the North Sea could eventually enter the human food chain through fish.

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Insect Pests Targeted

Controlling insect populations by tinkering with insect brains is not new, but some "mind-linking" chemicals discovered lately promise a higher degree of safety than most chemicals used in pest control, says Dr. Michael E. Adams, assistant professor of entomology at the University of California in Riverside.

Writing in the 1986 Yearbook of Agriculture, Adams describes two of the newer chemical insecticides which control insects' hormonal systems through their brains: chlormedimorph and methoprene.

While there are forms of biological controls—such as sex attractants and viral diseases—that harm only the target pest, chlormedimorph and methoprene are the

first chemical insecticides targeted primarily to insects.

Dr. Adams says the most effective of today's crop protection insecticides are nerve poisons which are toxic to non-target organisms as well as to targeted insects. The new chemicals, on the other hand, tinker with neurohormone systems that are peculiar to insects, not to humans or other animals.

When chlormedimorph is sprayed on plants, Dr. Adams says, caterpillars are so disoriented after just a few bites that they leave the plants. And, when chlormedimorph is sprayed on the eggs of these insects, the eggs fail to hatch.

The insecticide works by changing signaling.

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Diagnostics Market Reflects Shift in Health-Care System

Dramatic changes in the health-care industry because of cost containment pressures are resulting in major shifts in the structure of the health-care system.

The market for clinical diagnostics products reflects these changes more than any segment of the health care industry, according to Eric Rosenbaum, of Arthur D. Little, Inc.

Mr. Rosenbaum, who has completed a study of the US clinical diagnostic market, says demand for clinical diagnostics products will grow at 8 percent a year from \$3.7 billion in 1985 to \$6.7 billion in 1990.

"Within this market the most rapid growth, in percentage terms, will take place over-the-counter (OTC) and in physicians' offices," he says, adding that the hospital market will still account for 70 percent of product sales in 1990.

The major force for change in clinical diagnostics products, as well as paid services provided by hospital and commercial laboratories, physicians' offices, and drugstores is the prospective payment system for reimbursement of hospitalized patients on Medicare.

"Prior to the introduction of Diagnostic Related Groups (DRGs) in October 1983, there was a spendthrift attitude towards diagnostic testing because of lenient policies that called for 100 percent reimbursement," Mr. Rosenbaum comments. "Today, a far more fiscally conservative attitude prevails

because every test performed is charged according to a fixed reimbursement fee."

According to Mr. Rosenbaum, the number of physician office laboratories will double in five years. "In 1985, there were 22,500 laboratories in physician offices, and by 1990, there will be approximately 48,000," he predicts.

"This rapid growth is due to a significant shift from individual and small group practices to larger group practices which are better equipped to offer on-site laboratory services," he adds.

The A.D. Little executive says clinical chemistry represents one-third to one-half of the total lab business in the hospital. "We have good reason to believe that while at present, clinical chemistry is only one fourth of the business in physician offices, the same potential exists," he says.

This opportunity, according to Mr. Rosenbaum, results from an increase in group physician practices that can afford to hire in-house laboratory technicians. At the same time, because of DRGs, some of the tests formerly performed in the hospital prior to surgery are now being done outside the hospital in the doctor's office.

The result of the market moving away from the hospitals and commercial reference labs, is that physicians are in a strong position to take advantage of this new opportunity," he says.

He emphasizes that diagnostic products

Continued on Page 21



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OILS, FATS & WAXES

Coconut Oil Pricing Levels Supported by Dealer Trading

Coconut oil pricing is stronger now than it has been since January of this year. At the same time, the market has been very erratic lately and seems currently to be easing downward. Dealers and traders are not ready to call this a trend, though, given the unpredictable nature of the market in recent weeks.

The price began steadily rising in September, largely as a result of a spurt of dealer trading. In October the rise became considerably steeper, jumping 7 cents during the course of the month. Since late last month the price, though high, has been erratic and unpredictable.

For the most part, the market has been running on the strength of dealer to dealer trading since the initial firming began two months ago. Since that time the fundamentals have changed little, sources say, in that consumer buying is at a minimum, oil is readily available, and the market is being supported by dealer trading.

The changes that have been seen have been in the level of paper trading and the subsequent effects on pricing. According to a brokerage source, higher pricing saw the introduction of more copra onto the market, which served to weaken pricing.

BUYING BACK COPRA

Some origin dealers had been buying the material back, the source says, and then releasing it when prices firmed again. "An origin miller and US and European dealers were coming in and buying whenever the market softened," says a brokerage source. The result of activity like this has been the instability seen in the market, he says.

Consumers, in the meantime, are staying away from these strong levels, having stocked up extensively when prices were low. "Consumers don't need the material right now," says a buyer. "We'd have a hard time selling end-products with these raw material costs," he says, referring to production of coconut oil fatty acids.

Noting that the market cannot thrive for long without consumer activity, a source says, "Dealers can't do this forever — they have to ship eventually." Other sources agree, pointing out that producers in the Philippines are likely to be anxious to fill January contracts soon.

"They still have quite a bit of oil to sell before January," says a source, noting that freight commitments and impending holiday time off will spur the Philippines producers to sell by the middle of December. "Since they want to sell, prices may come down," says the source.

At the same time, US buyers' supplies are thought to be starting to ease their way down. "In another month or so consumers will have to buy," says a consumer. Asked to predict what will happen next, a brokerage source says, "The price may come down, but the

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

Cottonseed oil, Valley, 1/2c. per lb.
Lined, extracted, 24% bulk, Minneapolis, \$5 per ton
Palm oil, NY, 1/2c. per lb.
Soybean, 44% bulk, Decatur, 80c. per ton

CHANGES/DOWN

Coconut oil, NY, 1/2c. per lb.
Cottonseed, 41% bulk, Memphis, \$5 per ton
Lard, loose, bulk tanks, Chicago divd., 2c. per lb.
Peanut oil, Southeast (restricted), 1/2c. per lb.
Soybean oil, Decatur, 58c. per lb.

OILS, FATS INDEX

The Oils, Fats & Waxes index reflects the prices of 11 representative materials in this sector and the quantity of each produced in 1985.

Nov. 14, 1986 81.81
Nov. 7, 1986 82.74
Oct. 17, 1986 78.46
Nov. 15, 1985 86.37

Chemical Prices Start on Page 52

consumers may also panic first and buy." At this point, traders feel that it is a waiting game to see whose needs are greater, those of the buyers or those of the sellers.

CORN OIL — Availability of this oil continues to be very tight, with prices maintaining strength and easing upward. Consumers are said to be staying away from these high corn oil prices, except for free-standing refiners who do not have their own crushing facilities.

Interest among these refiners is strong, sources say, which is helping to keep the market as tight as it is. This interest is expected to remain at its current high level until early December, when refining activity generally sees a slowdown, according to an industry source. At that time it is hoped that crushers will be able to catch up to demand and begin to ease the tight supply situation.

LARD — The price of lard is down from last week's level, and has come down a total of more than 4c. per pound over the last four weeks. Traders have been seeing declining buying interest in lard, in both the domestic and export markets. The drop in interest is attributable to consumer avoidance of cholesterol, and increased switching to lower-cholesterol vegetable fats, according to an industry source.

PEANUT OIL — The market for this oil is quiet, as consumers are staying away from the high levels reached by peanut oil prices in recent weeks. Sources say that the buying that is going on is primarily among those buyers who tend to go specifically with peanut oil, while those who can substitute are doing so.

Prices are not expected to ease appreciably in the near future, though, since supplies are tight. At the same time, slack demand should prevent any serious shortages from occurring, sources say. As one brokerage source put it, "You can find enough oil to satisfy the thin demand that's around."

Since world peanut oil prices are generally lower than those of US oil, export business for US dealers has been nil, sources say. The price of US oil is not expected to rise much further, since it is already nearly as high as the US cost of imported oil.

RAPESEED OIL — The price of this oil has come down to 82 1/4 to 86 1/4c. per pound, in

Continued on Page 16

FRIDAY SPOT PRICES

MARKET CLOSE NOV. 14, 1986

CRUDE VEGETABLE OILS

Corn oil, NY lb. .20 1/4
Corn oil, Pacific lb. .NA
Corn oil, Midwest lb. .20 1/4
Cottonseed oil, Valley lb. .17 1/4
Lined oil, Minneapolis lb. .25
Palm oil, NY lb. .18 1/4
Peanut oil, Southeast (restricted) lb. .30
Soybean oil, Decatur lb. .1441

REFD. VEGETABLE OILS

Coconut oil, L.W., NY lb. .25 1/2
Corn, jumbo tanks lb. .2680
Cottonseed oil, jumbo tanks, NY lb. .27
Peanut oil, jumbo tanks, NY lb. .3830
Soybean oil, NY lb. .19 1/4

OILMEALS

Cottonseed, 14% bulk, Memphis ton \$180
Lined, extracted, 34% bulk, Fargo ton \$110
Peanut, 50% bulk, SE, Alabama ton \$185
Soybean, unrefined, 44% bulk, Decatur ton \$155.80

FATS & GREASES

Grease, white, chicken, tanks, divd., NY lb. .10 1/4
Grease, yellow maximum 10%, 1/2 tanks lb. .9 1/2
Lard, loose, bulk tanks, divd., Chicago lb. .13
Tallow, inedible, fancy, tanks, divd., NY lb. .12 1/4
Tallow, inedible, blot, tanks, divd., NY lb. .12

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AROMATIC ORGANICS

Styrene Makers' Recent Gains Reflect Demand and Downtime

Styrene producers say that the movement to raise prices that began in September has met with considerable success.

Contract pricing in August was reported at approximately 18 cents per pound. At present, most producers quote a contract level of 24 cents per pound. "By and large, 24 cents (per pound) is our base level," says a producer, and an analyst observes that "most of the market is at 24 cents (per pound); there is not much (business) below that." However, with discounting, a producer notes, "most (large-volume) transactions are around 23 cents (per pound)."

Some producers announced list prices as high as 27 cents per pound for November 1, and one says "there was a potential for some business to move at 25 cents to 26 cents (per pound)," but this became difficult when one producer did not make a change.

Huntsman Chemical Corporation moved to a price of 25 cents per pound less a 3-cent-per-pound temporary voluntary allowance on October 1, and currently is said to be at 23 cents per pound.

A rival says that "producers, with the exception of one, got up to the 24-cent- to 27-cent-per-pound (list price) range. It looks like it's shaking out at 24 cents (per pound)," with the granting of TVA's off the higher prices. Producers note that the market was fairly quiet during the first two weeks of the month, as there was a fair amount of pre-buying activity in late October.

Though competing producers point out that Huntsman is not a particularly major player in the merchant market, one says that "I have seen knowledge of Huntsman's pricing get out to some customers who have never used them in the past."

CONTRACT POLICIES
Huntsman has asserted that it does not discount off its list price level, which it feels is a realistic reflection of the market, and believes that the market might operate more efficiently if other producers did the same.

"We are not specifically aware of any Huntsman contracts with discounts," acknowledges a rival. However, when word of Huntsman's low list level gets out, his large customers tend to expect that price to be matched without at the same time offering to relinquish the discount provision of their contracts.

Another producer defends the policy of granting discounts. "It's unrealistic to think that everyone is going to pay the same price," he says, citing such factors as economies of scale and geographic location.

Producers attribute the upward pricing trend in recent months in part to the passing through of higher feedstock benzene costs. Since September 1, benzene spot pricing has risen 10 cents per gallon, and contracts have risen 7 cents to 10 cents per gallon.

Strong demand from the polystyrene sector did not tail off during the third quarter as predicted based on the usual seasonal pattern. It is estimated that demand from this area, which accounts for better than half of the styrene consumed, is running close to 10 percent ahead of last year's pace.

Unscheduled downtime in the industry, on top of numerous routine maintenance shutdowns, has played a role in tightening the market, producers say.

A 500-million-pound-per-year part of the Comar facility in Carville, La., went down unexpectedly for 8 days in September; Chevron Corporation's 625-million-pound-per-year St. James, La., plant was forced down for about half of October; most recently, Shell Canada's plant has reportedly shut a substantial amount of production during the past week or so due to problems with a benzene unit.

Bureau of Census trade figures for the third quarter reflect the changing styrene picture. With domestic producers hard-

pressed to meet commitments here, exports during the third quarter fell off by a third from second-quarter levels. Non-US producers, recognizing the strong US demand and higher price, more than doubled the amount of materials they shipped into the US market from the second to the third quarter.

In the months to come, producers say they expect the market will continue to be firm.

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

None

CHANGES/DOWN

None

AROMATICS INDEX

The Aromatic Organics Index reflects the prices of 14 representative materials in this sector and the quantity of each produced in 1985.

Nov. 14, 1986	167.84
Nov. 7, 1986	167.84
Oct. 17, 1986	167.84
Nov. 15, 1985	167.84

Chemical Prices Start on Page 52

given expectations of strong polystyrene demand, maintenance turnarounds scheduled for the early months of 1987 and stable or slightly higher feedstock pricing.

AROMATIC SOLVENTS — Amoco Chemicals Company says that pricing on two of its highly aromatic naphthalene solvents has been cut this month.

"Panasol AN-2L" has come down 40c. per gallon, to a level of \$1.35 per gallon, from the previous price of \$1.65 per gallon. "Panasol AN-2K" has moved down 40c. per gallon, to a price of \$1.10 per gallon from the previous level of \$1.50 per gallon.

The company attributes the changes to a passing through of lower basic aromatics pricing this year and market trends. The prices of the two products had been unchanged since June 1984.

Amoco says that its "Panasol AN-3N" price is holding steady at \$1.05 per gallon. This price was reduced in April.

BTX — The spot benzene market last week was quoted at 87c. per gallon, up from 85c. the previous week, and equal to the general contract price level in the industry. One producer, Standard Oil, has a posting of 90c. per gallon.

According to a trader, the market was "not frantic, but firm" last week. Contributing to the firmness in the market, he says, has been strong demand for the major derivatives styrene, cumene, and cyclohexane.

Imports of benzene into the US during the month of September fell to 5.9 million gallons, the lowest level in more than a year, according to Bureau of Census figures. One market player says that, should spot pricing reach the 90c. per gallon level, heavier imports are likely.

Since September 1, the spot benzene market has firmed approximately 10c. per gallon, from 77c. to 87c. per gallon. Spot toluene pricing, on the other hand, was quoted last week at 87c. per gallon, equal to its September 1 level. The widening spread has led to speculation in the industry over the possible startup of some hydrodealkylation capacity.

The toluene market actually did keep pace with benzene last week, firming 2c. per gallon from the previous week's 85c. per gallon price, a move attributed more to a lack of supply than to demand.

One basic aromatics producer credits part of the trend towards higher pricing to year-end effects. "People are putting material in

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AROMATICS

Inventory...suppliers don't want to sell, and buyers want to buy," he says. It is noted that buyers have an incentive to bolster inventories in order to avoid the 1.8c. per gallon Superfund tax that becomes effective January 1.

Xylene contracts are said to have been settled on at 78 1/2c. per gallon. Leading buyer "Amoco was at 75c. (per gallon), the others were at 78c. (per gallon), so they split the difference," says a trader. The spot market had been approaching 80c. per gallon, but weakness in the paraxylene sector reportedly provided some downward pressure.

BENZOYL CHLORIDE — Occidental Chemical Corporation says that, effective November 17, it is increasing its off-list price for tanktrailer and tanker peroxide grade benzoyl chloride by 5c. per pound on spot purchases and as contracts allow. Pricing is f.o.b. Niagara Falls, N.Y., freight allowed.

List pricing will be unchanged at 63 1/2c. per pound, freight allowed, on tanktrailer and tanker deliveries. The off-list price adjustment on bulk shipments is attributed to increases in labor and raw material costs. Prices for drum quantities remain unchanged.

NITROTOLUENE — First Chemical Corporation says it is raising its p-nitrotoluene price by 15c. per pound, effective immediately for spot material and as contracts permit. The bulk price changes from 75c. to 90c. per pound, f.o.b. Pascagoula, Miss., and the drum price for truckloads rises from 90c. to \$1.05 per pound in truckloads, f.o.b. New Orleans.

A company spokesman says the move reflects tightness in the market, which could be aggravated next year should production tail off due to slackening demand for the o-nitrotoluene isomer in the agricultural sector.

TDI — Producers of toluene diisocyanate say they will be increasing selling prices by 8c. per pound, effective December 1. New selling prices are not to exceed list pricing, which remains at \$1.01 per pound in bulk.

"Material is short, and the market is very tight," says one producer, and another comments that the price increase "is justified on the basis of demand and the need to restore profitability" to the industry. An industry-wide price initiative during the first quarter of this year was, for the most part, unsuccessful.

Producers point out that the export business has been strong, with attractive prices overseas, and that feedstock toluene costs have been firm. From a supply standpoint, it is noted that numerous turnarounds are scheduled in the coming months.

TOLUENESULFONYL CHLORIDE — Akzo Chemie America, Chicago, and Rii-Chem Company, Inc. say their pricing on p-toluenesulfonyl chloride has risen in recent weeks to \$1.55 per pound for direct delivery.

Biddle Sawyer Corporation announced a price increase earlier this month to \$1.85 per pound for direct shipment. A Rii-Chem spokesman does not rule out further increases in his company's pricing in the weeks to come, saying that "prices are increasing every day from Japan."

Biddle Sawyer receives its material from Japan as well, and both suppliers point to the reduced value of the US dollar against the yen and lower saccharine production levels, upon which p-toluenesulfonyl chloride production depends indirectly, as reasons for the change.

Akzo Chemie receives its material from the Netherlands, and says it is sold out for the remainder of 1986. A spokesman notes that orders already booked will be delivered.

Carbide Sells

Continued from Page 3

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will enhance our US position as well as numerous countries abroad." Rhone-Poulenc Inc.'s US agrochemical operation is headquartered in Minneapolis, Minn., N.J. This expansion will add approximately 2,400 full-time employees located in the US. The Union Carbide Agricultural Products company is headquartered on a 30-acre tract of land at Research Triangle Park, N.C., where the administration, marketing and R&D functions reside.

Its principal manufacturing facilities are at Institute, West Virginia; Woodbine, Georgia; Clinton, Iowa; St. Joseph and St. Louis, Missouri; Ambler, Pennsylvania; Calgary, Alberta, Canada; Beziers, France; and Batao, Brazil. There are six other manufacturing sites around the world. Excluded from the acquisition is the agricultural products business in India.

Lummus Crest Being Realigned

Combustion Engineering, Inc. is aligning its Lummus Crest subsidiary in response to what the company calls "changing conditions in its worldwide markets."

C-E says that beginning in 1987, Crest will concentrate process technology, engineering and construction work at its offices in Houston, Toronto, and the Hague, Netherlands. Both its headquarters and technology center from Bloomfield, N.J. to West, Tex. They will share facilities with the Crest engineering center in Houston. Consolidated operation will consist of divisions, the Lummus process technology and the Crest engineering services division.

The process technology division will be on a worldwide basis, the company says, and will be responsible for the engineering, design, and construction of petrochemical and petrochemical processing facilities. Technologies such as ethylene, cumene, styrene, and the "Crest" process will continue to be developed and marketed.

The Crest engineering services division continues to provide engineering, management, and construction management services for the field development of oil and offshore oil and gas production facilities. It will provide engineering, management, and construction management services to the hydrocarbon processing industry.

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OILS, FATS & WAXES

Continued from Page 11

drums. The fall in price is the result of new crop oil's presence on the market. The yield is said to be strong, promising a good supply this year.

"The Canadian crop is all in," says a source, who is saying that "it looks like a bumper crop" for rapeseed this year. The size of the crop is said to be attributable to incentives, in the form of guaranteed minimum returns, offered to farmers in Canada.

The quality of the European rapeseed oil continues to be poor, a source says, resulting in more inquiries to US crushers and refiners from buyers in Europe and Japan. The US crop, not due for harvest until Spring, is said to be in good shape.

SUNFLOWERSEED OIL — The price of this oil is quoted at 15 1/2c. to 16c. per pound for crude material, f.o.b. Minneapolis. The recent completion of the harvest resulted in a storage space problem, forcing farmers to move some of their seeds before they wanted to, according to an industry source. Currently supplies are plentiful and the market is trading at light levels, sources say.

At present dealers are waiting for some export business to Mexico. The expected orders from Mexico have been delayed, though, by the efforts of their government to support their own crushers. As a result, Mexico has been buying US seed, transporting it to its country, and then crushing it for oil, a source says. This is less economical than buying US oil, says the source, and present expectations are that Mexico will be in the oil market by January.

TUNG OIL — The price of this oil is quoted between 31c. and 33c. per pound for material in tanks imported into New York. Trading is progressing at normal levels, with "reasonably good" demand, according to an industry source. At the moment supplies are ample, but rumors of a short crop in Brazil persist. "We keep hearing about a short crop and impending higher prices, but we still haven't seen anything," says a source.

WAXES

BEESWAX — The price of refined beeswax is quoted between \$3.05 and \$3.10

for white in slabs in 100 pound containers, and between \$3.10 and \$3.20 for white in bricks in 100 pound containers. Yellow beeswax is quoted between \$2.95 and \$3.05 in slabs, and between \$3.00 and \$3.10 in bricks, both in 100 pound containers. The market for beeswax is said to be steady, with regular buying activity facilitated by ample supplies.

USDA Scientist 'Distinguished'

A researcher who uses ultraviolet light and bacteria to detect farm chemicals from polluting groundwater is the US Department of Agriculture's 1986 "Distinguished Scientist of the Year."

Philip C. Kearney, a biochemist who heads the Pesticide Degradation Laboratory in Beltsville, Md., will receive the highest award given for scientific achievement and leadership by USDA's Agricultural Research Service.

ARS administrator Terry B. Kinney, Jr., will announce Kearney's award and awards to 10 other agency scientists during a ceremony in Washington Tuesday.

"Dr. Kearney is a versatile scientist, an innovative leader and a creative researcher," says Kinney. "Many farmers now dispose of pesticide wastes somewhere on their land, so Kearney's work to economically degrade those wastes right at the dump site, before they pollute groundwater, will benefit future generations as well as our own."

Dr. Kearney designed a mobile unit that combines high-energy ultraviolet light with oxygen to break down a pesticide before it enters the soil. "We moved the unit to a research farm and tested it on 11 major pesticides and were able to break down every one of them," he says.

Dr. Kearney also leads a group of researchers using biotechnology to engineer bacteria that destroy pesticides. The group has isolated and cloned a gene — that produces the enzyme parathion hydrolase — from a type of bacteria called a flavobacterium, increasing its ability to destroy pesticides.

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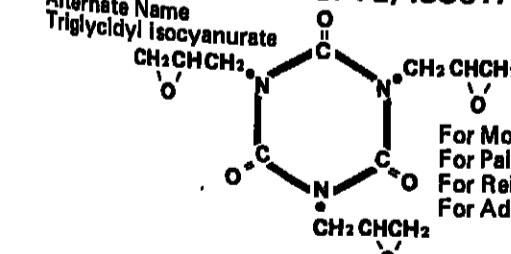
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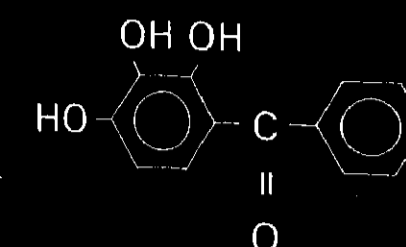
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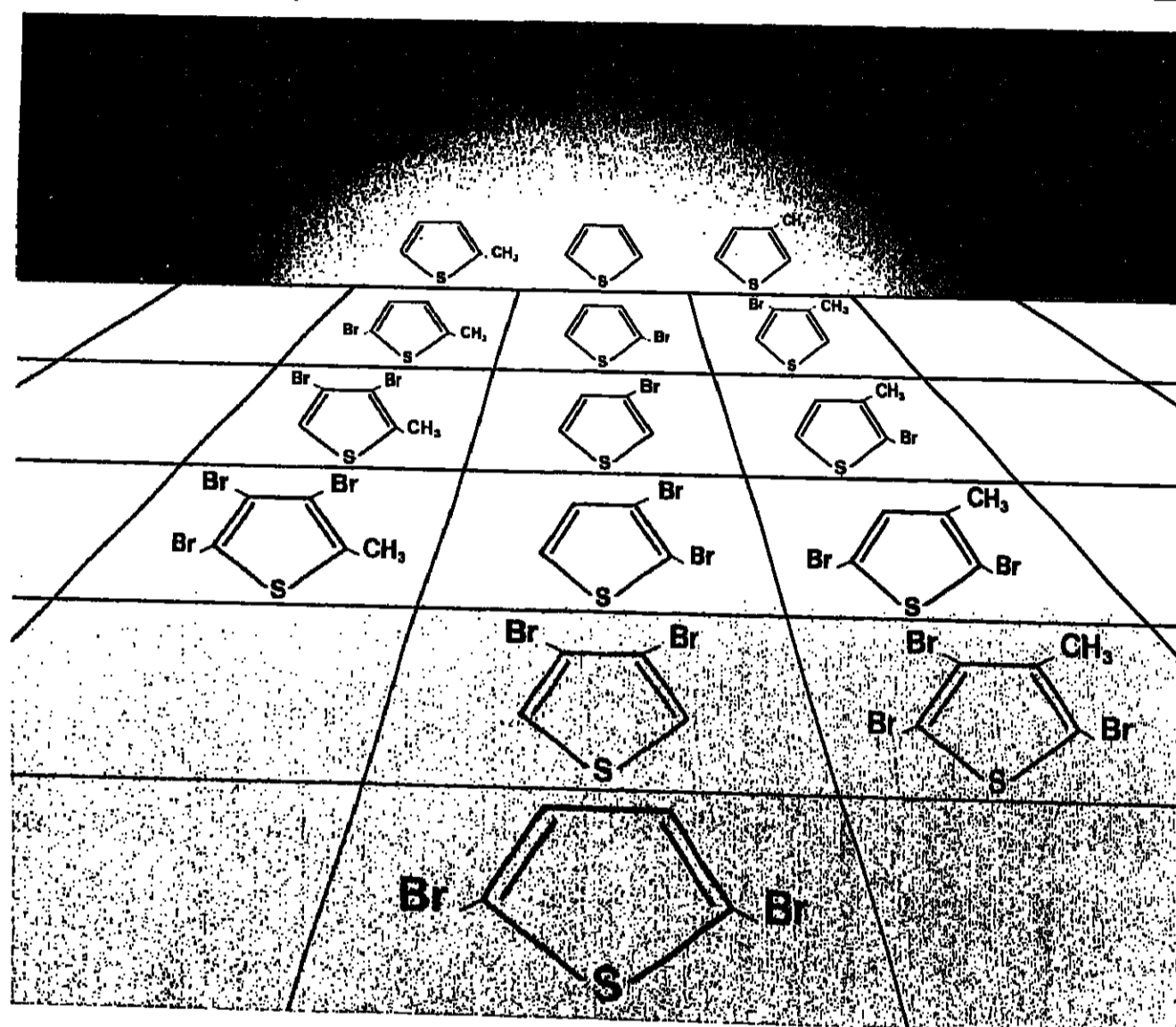
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Finland Eyes

Continued from Page 3

overseas acquisitions, joint ventures and marketing agreements, but not at the pace the industry has kept during the past two years. Federation estimates are for a modest 2 percent growth in Finnish chemical production next year, up from 1.5 percent in 1986, but well below the 4.1 percent average for 1975-1985.

Last year saw total gross value of production by the Finnish chemical industry of about \$7 billion, according to federation figures, with chemicals, fertilizers, plastics and fibers accounting for 31 percent and oil refining products 45 percent. The industry accounts for about a 15 percent share of production by all Finnish industry and a 10 to 12 percent share of exports.

Value of chemical exports during 1985 was about \$2 billion, with 37 percent going to European Community countries, 28 percent to the European Free Trade Association

(EFTA), in particular Norway and Sweden 19 percent to East Europe and 16 percent to other countries.

James R. Hickey, managing director of Strategic Analysis Europe, Brussels, Belgium, agreed with Mrs. Nuorteva's prediction that a variety of vehicles for internationalization are likely to be used by the industry in the years to come, but cautioned that there are some pitfalls in traditional thinking.

With the chemical industry moving away from value added products, exports through distributors, agents or sales offices abroad, "don't put you close enough to the customer," he says. At the same time, he admits that some multi-product companies have a broad range of products that they need to on agents and distributors at times.

In his view, the Finnish chemical industry has moved into a "second phase" in its development strategy where companies are making acquisitions of foreign companies to their core businesses or taking up positions in such companies.

Taking Kemira, Finland's largest chemical company, as an example, Mr. Hickey points out that during the four-year period from 1982 through 1985 the company's turnover has approximately doubled to 11 billion, 60 percent of it coming from abroad.

Acquisition of the former American Cyanamid Company titanium dioxide plant at Savannah, Ga. in mid-1985 has been exceptionally profitable acquisition so far, he says, giving the company "a base for the largest titanium dioxide market in the world, the US." The US plant adds 100,000 tons of the pigment to Kemira's 80,000-ton domestic capacity at Pori.

Acquisition of the Donald MacKay Group in 1984 by Kemira's Tikkurila subsidiary gave the group a strong position in UK coatings business and access to technology, while purchase of the Rozenberg fertilizer complex of Esso Chemicals, the Netherlands, also in '85, provided a lion in ammonia, the one plant which the company has lacked in support of its 15-million-ton fertilizer base.

KEMIRA PLANS AMMONIA

Further, Kemira has plans for a 200,000-ton ammonia plant at the Hullu BP Chemicals in the UK to be on stream by the Fall of 1988 and is converting an 80-ton ammonia plant at Oulu to produce material, also for completion in '88.

While Kemira officials attending the meeting were reluctant to detail the company's overall ammonia requirement, it's clear the firm is a net buyer of some 300,000 tons of ammonia annually, two-thirds of it imported from the Soviet Union.

Earlier possibilities for a world-scale ammonia plant in Finland, based on Soviet technology, bogged down when Kemira and Neste, state-owned oil firm and pipeline operator, were unable to come to terms on gas prices.

Liko Kemira, Finnish Sugar Company, another company with a sizable base in the domestic market, has been building its national presence during the past three years through acquisition, joint ventures and exports, Mr. Hickey told the meeting. Turnover of the company's international divisions has been doubled over the past three years.

Unlike Kemira, however, the Neste division's most important products are specialty, value-added materials such as specialty sweeteners, sorbitol and fructose, and specialty enzymes.

Acquisition of the Edward Mendel Company in the US in 1984 brought Neste a firm specializing in tabletting and specialty varieties of specialty sugars, again a business for the Finnish parent.

Mr. Hickey also cites Priha Oy, a joint venture of Neste and Kemira producing formaldehyde resins for particle board and specialty adhesives, as the type of strategic alliance needed to penetrate foreign markets.

The company has been successful in bringing two joint ventures in politically sensitive areas — Mexico and Malaysia — as well as acquiring in 1985 Chembond Corporation, the third largest producer of these adhesives in the US.

In other ventures, Orion Corporation has licensed its NASH (nucleic acid synthetase) technology to E.I. du Pont.

Nemours & Co. and the latter will market the technology throughout the world, while Neste, one of the leading producers of sodium chlorate in Western Europe, has concluded a Canadian agreement whereby its electrolytic cell technology for producing sodium chlorate will also be marketed throughout the world.

For Finland, Mr. Hickey feels these and other such strategic alliances may be a critical factor in achieving more rapid penetration of foreign markets, particularly where international culture may play a major role in keeping countries out of certain markets.

Jukka Viinanen, senior vice-president, polyethylene, for Neste Oy, outlined the company's current position among Europe's polyethylene producers for the chemical companies.

With its acquisition of Unifos Kemi of Sweden two years ago, Neste laid claim to second place among Europe's polyethylene producers with 630,000 tons of capacity.

Further, the company has just signed an agreement with Himont Belgium BV under which Neste will acquire a 120,000-ton-a-year polypropylene plant at Beringen in Belgium.

The transaction is expected to be complete by the end of this year. Plans call for engineering work to begin on a new 120,000-ton PP plant at Neste's Porvoo complex using Himont's "Spheripol" technology.

Mr. Viinanen says the focus of the global polyethylene business is changing constantly. He points out that whereas Europe still had more than 500,000 tons of PE exports last year, this year the total will be more like 350,000 tons and in the next decade it's anticipated there will be very little, if any, export from Europe.

Meanwhile, in Saudi Arabia some 700,000 tons of capacity is already on stream and in Canada 565,000 tons is on stream or under construction.

The Neste executive estimates Far East projects add another 500,000 tons to the world total, although it is difficult to specify the projects by company, he says.

NESTE VIEW OF PE

Mr. Viinanen emphasizes that Neste doesn't consider itself to be in linear-low, low-density or high-density polyethylenes, but instead has looked at the business from another angle.

"We are in the film business, wire and cable, pipe, extrusion coating and molding businesses," he says, adding that, "That is the language the customer is talking and that is the language we intend to be talking."

Consumption of low-density and linear low-density for film uses in Western Europe is estimated at about 3 million tons, with molding uses taking about 350,000 tons, extrusion coating 300,000, wire and cable 150,000 tons and all other uses 225,000 tons.

Blow molding uses for high-density PE in Western Europe are believed to total about 700,000 tons per year, with injection molding accounting for nearly 500,000 tons and pipe, film and other uses totaling over 400,000 tons annually.

Mr. Viinanen told reporters in an interview prior to the congress he expects Neste Chemical sales of close to \$1 billion in 1987. Total Neste Group turnover is about \$7 billion annually.

The company claims 40 to 45 percent of the low-density polyethylene market now and expects to mount a strong polypropylene effort to fill a thermoplastics line that also includes polyethylene and polyvinyl chloride units.

Mr. Viinanen says that in addition to providing an outlet for excess propylene from the company's 170,000-ton unit at Porvoo, part of the rationale for the move into PP was to stabilize the total thermoplastics picture.

Polyethylene prices fell some 30 percent over the first half of 1986, although raw material prices dropped by at least as much. The Nordic market for polypropylene is estimated at about 120,000 tons annually and is reported to grow rapidly. Mr. Viinanen says consumption in Finland is increasing in excess of 10 percent annually.

In petrochemicals, Neste's board has approved an increase in ethylene production from 200,000 tons to 230,000 tons annually. Additional capacity is expected to be available by April of 1988 and a doubling of capacity for cumene to 140,000 tons will be completed shortly. At the same time, debottlenecking and use of Monsanto Company

technology will raise phenol capacity at the Neste site to 75,000 tons per year.

Neste's polybutene-1 project with Idemitsu is going ahead and pilot facilities will be built at both Porvoo and Chiba toward possible construction of a commercial plant by 1990, depending on results from the pilot facilities.

Neste's plan to build a \$100 million methyl tert-butyl ether plant in the Soviet Union through its engineering affiliate is on track and may even have been speeded up by the fact that there are now possibilities for a joint venture project rather than the compensation agreement as originally conceived, Neste says.

In another MTBE project, Neste has a 10 percent share in a 500,000-ton plant being built by Saudi Basic Industries Corporation.

Sabic owns 70 percent of the venture and EniChem of Italy and Arab Petroleum Investment Corporation each hold shares of 10 percent. The facility is scheduled for 1988.

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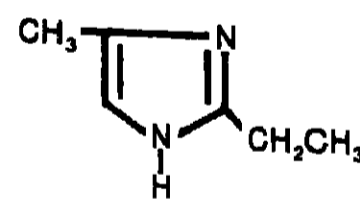
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Chemical Finance

USX Continuing Discussions With Would-Be Acquirer

USX Corporation said it is continuing its discussions with Carl Icahn "in an effort to clarify his proposal to offer \$31 per share in cash for all of USX's common stock," it said. Icahn's offer is conditional on, among other things, the right to carry out a due diligence investigation. USX added that there is no assurance that any agreement relating to Icahn's proposal will be reached.

USX also said that the previously announced restructuring study is proceeding, and that First Boston Corporation and Goldman, Sachs & Co. will present various alternatives for review and evaluation toward the end of last week.

In another development, the Supreme Court has let stand a ruling that USX discriminated against some shareholders when its \$3.75 billion tender offer for Marathon Chemical Company, of Findlay, Ohio, was completed in 1982. According to the ruling, no discrimination occurred when USX extended the date of the offer, allowing additional shareholders to get into the pro-rata pool for the cash portion of the merger, which was unusually more generous than the securities exchange offer for the balance of the shares.

Vista Chemical Makes Its First Public Offering

Vista Chemical Company, the privately held producer of polyvinyl chloride and detergent chemicals which was once part of the Conoco Incorporated operation of E.I. du Pont de Nemours & Co., is planning to make an initial public offering of 1,000,000 shares of its common stock through an underwriting syndicate headed by E.F. Hutton & Co. The initial public offering price is expected to be in the range of \$18 to \$20 per share.

Proceeds will be used to redeem the company's outstanding special preferred stock, repay indebtedness to be incurred to repurchase 3,705,000 common shares issued upon the exercise of warrants prior to the completion of the offering, and to reduce other indebtedness.

Pharmacia of Sweden Raises Income 21 Percent

Pharmacia AB, the biotechnology and pharmaceutical company based in Sweden, raised its net income 21 percent in the first nine months to 63 cents per American Depositary Receipt.

Ferro Purchases Rosemar, Additive Supplier

Ferro Corporation, Cleveland, Ohio, has acquired Rosemar Industries, Inc., Schaumburg, Ill., a suburb of Chicago. Rosemar is a leading manufacturer of dyes, colors and additives for plastics and operates plants in Schaumburg, Ill., and Placentia, Calif., near Los Angeles, Ferro said.

The acquisition of Rosemar will give Ferro a total color capability by the addition of liquid colors to the company's existing products and services, comprising pellets, concentrates and dry powder colorants, pre-colored resins and custom-color compounding, a spokesman for Ferro said.

The Rosemar operations will become a unit of Ferro's Stryker Thermoplastics Division, in Stryker, Ohio.

Hoechst-Celanese Merger Gets Gov't Review Date

The Hart-Scott-Rodino waiting period under the Antitrust Improvements Act for the merger of Celanese Corporation and American Hoechst Corporation will expire at 11 PM Eastern Standard Time on November 21, American Hoechst announced. After that date, the Justice Department can extend the period by requesting more information if it sees any antitrust conflict in the proposed merger.

Hoechst said the date was set after it made changes in certain Standard Industrial Classification codes previously furnished by that company to Federal Trade Commission and Antitrust Division of the Justice Department.

Standard Oil Gets \$5.5 Billion Credit Line

Standard Oil Company, Cleveland, Ohio, has accepted offers from 45 banks to provide committed credit facilities totaling \$2 billion and uncommitted facilities amounting to \$3.5 billion. These lines of credit replace earlier committed facilities totaling \$1.5 billion put in place last year and establish the uncommitted facilities for the first time.

The new committed facilities run for 7 years. The uncommitted facilities, which involve no fees or predetermined rates, amount to promises by the banks to make reasonable endeavors to lend Standard Oil money, should it be needed. The terms of the arrangements are confidential, Sohio stated.

Gulf Resources Proceeds With Tender Offer

Gulf Resources & Chemical Corporation, Boston, Mass., has mailed the offer document relating to the previously announced cash offer for Imperial Continental Gas Association Ltd. The offer, valued at \$1.07 billion at last week's exchange rate, is being made by Gulf Resources (UK) PLC, a wholly owned subsidiary, incorporated in the UK for this purpose.

Combustion Engineering Wins Syncrude Job

Combustion Engineering Simcon Incorporated has been selected to develop a "Phase 3200" operating training simulator for Lummus Crest's "LC-Fining" process used at Syncrude Canada Ltd.'s oil sands extraction facility at Fort McMurray, Alberta, Canada. This is the second simulator project awarded by Syncrude to Simcon.

For this project, Simcon is supplying Syncrude with a full-scope process simulation system, including design and engineering, hardware, proprietary software, training and project management through site acceptance.

ImmunoGenetic's Sales and Earnings Increase

ImmunoGenetics, Vineland, N.J., said its revenues increased more than 15 percent to \$4.9 million and its operating profits doubled for the quarter ended September 30, reflecting the continued strength of its core business operations in poultry vaccines and veterinary pharmaceuticals.

Net income for the quarter was \$282,419, or 4 cents per share, as compared to \$37,833, or one cent, in 1985.

Sterling Drug Buying 2 Million of Its Shares

Sterling Drug Inc. has authorized the purchase of up to 2 million shares of the company's common stock, with the assistance of Morgan Stanley & Co. The shares will be used for various employee benefit programs and for other corporate purposes. Sterling Drug has 59 million shares outstanding.

ALIPHATIC ORGANICS

Butadiene Takes

Continued from Page 5

their C4 streams, and attributes this trend to the sharp decline in exports this year. Co-cracking has become a necessity in Europe, Mr. Debrecezenl says, because the two major markets for European exports, US and Japan, have developed new sources of supply this year at a time when European production of olefin plants has been extremely high.

In recent years, he says, the US has absorbed over 600 million pounds a year of European butadiene, while Japan has consumed up to 180 million pounds. However, the sharp fall in crude oil prices earlier this year prompted a large shift to heavy feedstock cracking at US olefin plants, thereby increasing output of butadiene. At the same time, Japan began accepting shipments of butadiene from Singapore and Korea, reducing its European take to under 50 million pounds.

In the US, butadiene imports totalled only 350 million pounds through September of this year, compared to almost 750 million pounds in the same period last year. This import decline outweighs the surge in US production this year, and is credited as the main cause for the domestic inventory decline. As of November 1, US butadiene stocks stood at 199 million pounds, down from 217 million pounds September 1, according to Tucker Consulting Services, Dewey, Okla.

FALLING IMPORTS
Until this month, though, falling imports and stocks have not been able to stem the butadiene price slide. Prices have declined all year, falling from a January high of 26 cents per pound to 9 cents at present. Most of the slide took place in the first half, when falling crude oil values precipitated a large shift in US stream crackers to naphtha and gas oil feedstocks, thereby boosting butadiene output. Competitive pressures from imported material and domestic product kept pushing the price down through the Summer and Fall.

Current indications in the market, however, suggest the slide has bottomed out. Mr. Debrecezenl says the fourth quarter contract price in Europe is still under negotiation, and producers apparently are refusing to allow further deteriorations in contract selling prices. Hugh Fyiant, of Houston-based Pace Consultants, says not much butadiene is currently available for exchanges, forcing consumers to buy, rather than borrow, product. Supplies have declined in the latter part of this year, he says, noting both the decrease in imports, and the growing prominence of propane as a feedstock, a natural gas liquid with a low butadiene/ethylene ratio.

In addition to a rise in propane cracking and a decline in gas oil cracking, US butadiene production has also declined due to C4 co-cracking at one or two US ethylene plants,

and limited burning of butadiene for its fuel value, sources say. Furthermore, widespread C4 co-cracking in Europe has led not only to a decline in finished butadiene exports to the US, but also to a large decline in exports of crude C4 streams that are processed into butadiene in the US.

While the butadiene price may have reached bottom, several sources also note prices aren't likely to improve through the end of the year. The main factor here, sources say, is static-to-declining demand for the synthetic rubber product. Mr. Fyiant says that while demand for styrene-butadiene la-

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

None

CHANGES/DOWN

None

ALIPHATICS INDEX

The Aliphatic Organics Index reflects the prices of 20 representative materials in this sector and the quantity of each produced in 1985.

Nov. 14, 1986	222.80
Nov. 7, 1986	222.80
Oct. 17, 1986	222.80
Nov. 15, 1985	222.80

Chemical Prices Start on Page 52

tex and acrylonitrile-butadiene-styrene resin has increased this year, domestic styrene-butadiene rubber consumption has declined.

US styrene-butadiene rubber demand has been hurt in three ways this year, according to Mr. Debrecezenl. First, tire imports to the US have increased by 5 percent, he estimates. Tire imports from Japan are on the rise, he says, even though the value of the yen has reached a post-war high against the dollar. In addition, low cost tires from Eastern Europe have also undercut US sales. Domestic SBR producers have also been hurt by high auto imports (which carry five tires), and rising rubber imports.

A further blow to butadiene demand has come from a six-week turnaround recently taken at Goodyear's large Beaumont, Tex., polybutadiene facility.

Thus while butadiene supplies will be held in check, due to fewer imports, and increased domestic use of propane as a feedstock, demand will remain weak into 1987, and little hope is seen in the immediate future for firmer butadiene prices.

GLYCERINE — Production of crude glycerine, including synthetic, totalled 22.3 mil-

ALIPHATIC ORGANIC IMPORTS: SEPTEMBER

BUREAU OF CENSUS FIGURES FOR THE KEY ALIPHATICS

	SEPTEMBER		AUGUST*	
	QUANTITY	\$ VALUE*	QUANTITY	\$ VALUE*
Acetic acid	30,197	19,378	8,829,272	1,288,618
Acetic anhydride			1,453	6,730
Acetone	37,869,312	4,287,981	12,032,279	1,792,120
Chloroacetic acid	38,956	22,762	1,182	3,050
Chloroacetic anhydride	3,174,151	987,603	2,483,220	902,024
Chloroacetic acid	23,855,838	145,471,403	17,807,388	14,032,576
Chloroacetic acid	141,124	38,778	86,199	89,423
Formic acid				
Glycol	13,245,806	2,381,821	45,807,078	8,427,735
Hexamethylenetetramine	1,133,408	195,596	1,315,410	285,988
Isocaproic acid	2,452,212	747,937	17,824	7,382
Isobutyric acid	50,999	14,825	188,548	85,748
Isobutyric acid	1,234,474	808,648	870,977	599,082
Isobutyric acid	26,811,402	6,295,708	28,598,768	859,032
Methyl ethyl ketone	3,357,900	617,613	2,513,950	495,223
Octanoic acid	3,336,538	612,901	6,487,372	983,423
Octanoic acid	33,610	19,822	85,637	48,854
Pentamethylenetetramine			1,098,446	278,511
Pentamethylenetetramine di-PE	1,198,523	270,748	1,542,987	450,530
Propionic acid	905,882	497,263	1,518,455	722,238
Propionic acid	10,884,616	1,854,787	8,724,454	1,350,917
Tetrahydrofuran	2,472,120	928,773	2,825,220	982,963
Tetrahydrofuran	352,932	58,198	284,638	801,137
Tetrahydrofuran			1,890,008	190,846
Valeric acid, unpolymerized	1,578,006	276,458	1,125,880	197,843
Valeric acid	193,387	37,948	183	1,659
Valeric acid	151,704	319,863	185,969	845,900

*August value figures represent C.I.F. values; customs & value plus freight insurance.

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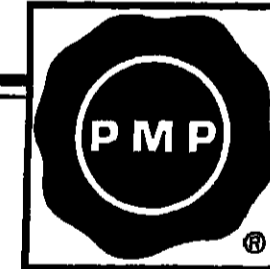


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ALIPHATICS

lion pounds in September, according to Commerce Department. That represents a decrease of 2.9 million pounds from August and 2.5 million pounds from September 1985.

Producer stocks of crude and refined glycerine stood at 48.6 million pounds, up 10 million pounds from August, and up 22.4 million pounds from the September 1985 level.

Glycerine imports amounted to 8.6 million pounds in September, compared to 6.1 million pounds in August and 2.3 million pounds in September 1985.

At the end of September, cumulative imports were 47.6 million pounds, compared to 26.8 million pounds for the same period last year.

At 1.6 million pounds, exports in September were up from the August level of 1.3 million pounds, but down from the September 1985 level of 2.6 million pounds. Cumulative exports through September stand at 12.7 million pounds, much less than the 22.8 mil-

lion pounds for the same period last year. Total domestic disappearance of glycerine from the revised August total of 28.1 million pounds. Year-to-date domestic disappearance amounts to 254 million pounds through September, and increase over the 203.2 million-pound level through September of last year.

MTBE — Rising toluene prices last week have contributed to a slight firming of methyl-tert butyl ether prices. The 2.3 gallon surge in toluene prices last week shifted MTBE "from a weak 64c. (per gallon) to a strong 64c." one producer says. Without the increase in toluene value, explains, MTBE prices would have slipped. But now, he says, MTBE is in a strong position.

However, another octane enhancer, ethanol, continued its steep price decline in October. Fuel ethanol prices plunged to 79¢ per gallon in October to a 79¢ per gallon slide in September, IRI says. The ethanol prices have now fallen from 82¢ per gallon to 79¢, IRI says, blaming the decline on oversupply.

VINYL CHLORIDE MONOMER — Industry sources say a successfully implemented polyvinyl chloride price increase this month is leading to price firming in the VCM market.

One producer says PVC prices will increase 1c. per pound this month, and the process VCM makers are realizing a big pound gain in selling values. This helps gain raises VCM market prices to 16 1/4¢ per pound. Furthermore, PVC makers are planning another price hike in December. If the PVC makers pass this on, sources say VCM prices are likely to increase.

Demand for VCM in the US vinyl market, making the monomer scarce in the market. One producer says shortages cropped up in the export market. The company has had to turn away buyers in recent weeks.

Diagnostics Market

Continued from Page 9

manufacturers will only have a short time to capitalize on these changes.

"Once laboratory systems are established in physicians' offices, it will be difficult for competitors to displace them. In addition, manufacturers will find that the successful direct sales force approach which was successful in the highly concentrated hospital market will not be economically feasible in the more diffuse physicians' offices."

In the over-the-counter diagnostics market, US sales are likely to increase 21 percent a year, from \$235 million in 1985 to \$610 million in 1990.

"The reason for this," says Mr. Rosenbaum, "is the consumer's desire to save time and money, as well as ensure privacy and personal control over health management." "The real opportunity is in over-the-counter

diagnostics exists for companies that are diversified and have both the ability to develop the products, and sell in consumer markets," he says.

"If you have the ability to market and sell products at the retail level, the technological ability can be acquired. The success factor will be the ability to stimulate and supply demand in the appropriate market segment. Companies that invest early in establishing brand loyalty will be well positioned to support new OTC product introductions," he notes.

While the market for clinical diagnostics remains competitive, and competition from abroad is intensifying, the A.D. Little analyst expects that some manufacturers will begin to consolidate in the next few years.

"Technology development is a primary basis for competition in this industry, and R&D is a major focus for participants because of both intense competition and increased customer demand for cost-effectiveness," Mr. Rosenbaum says.

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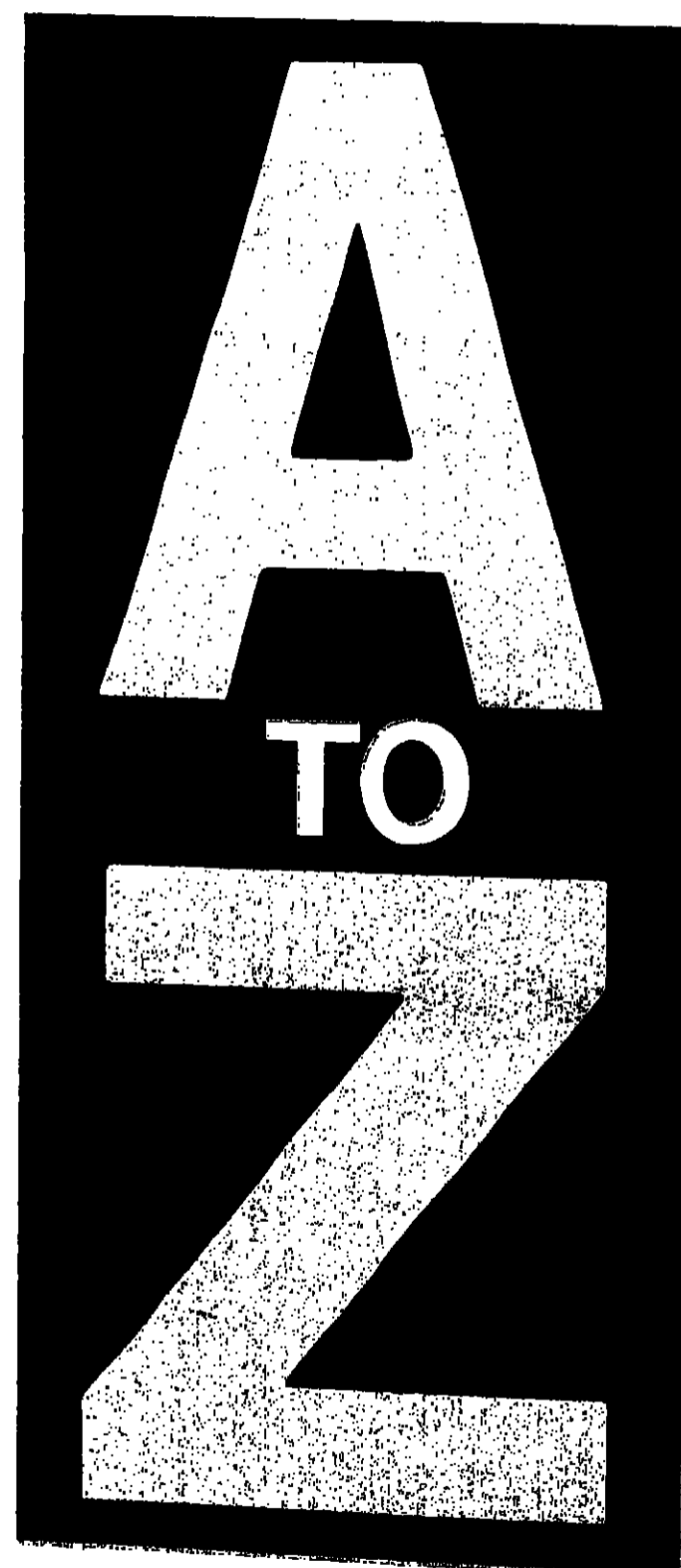
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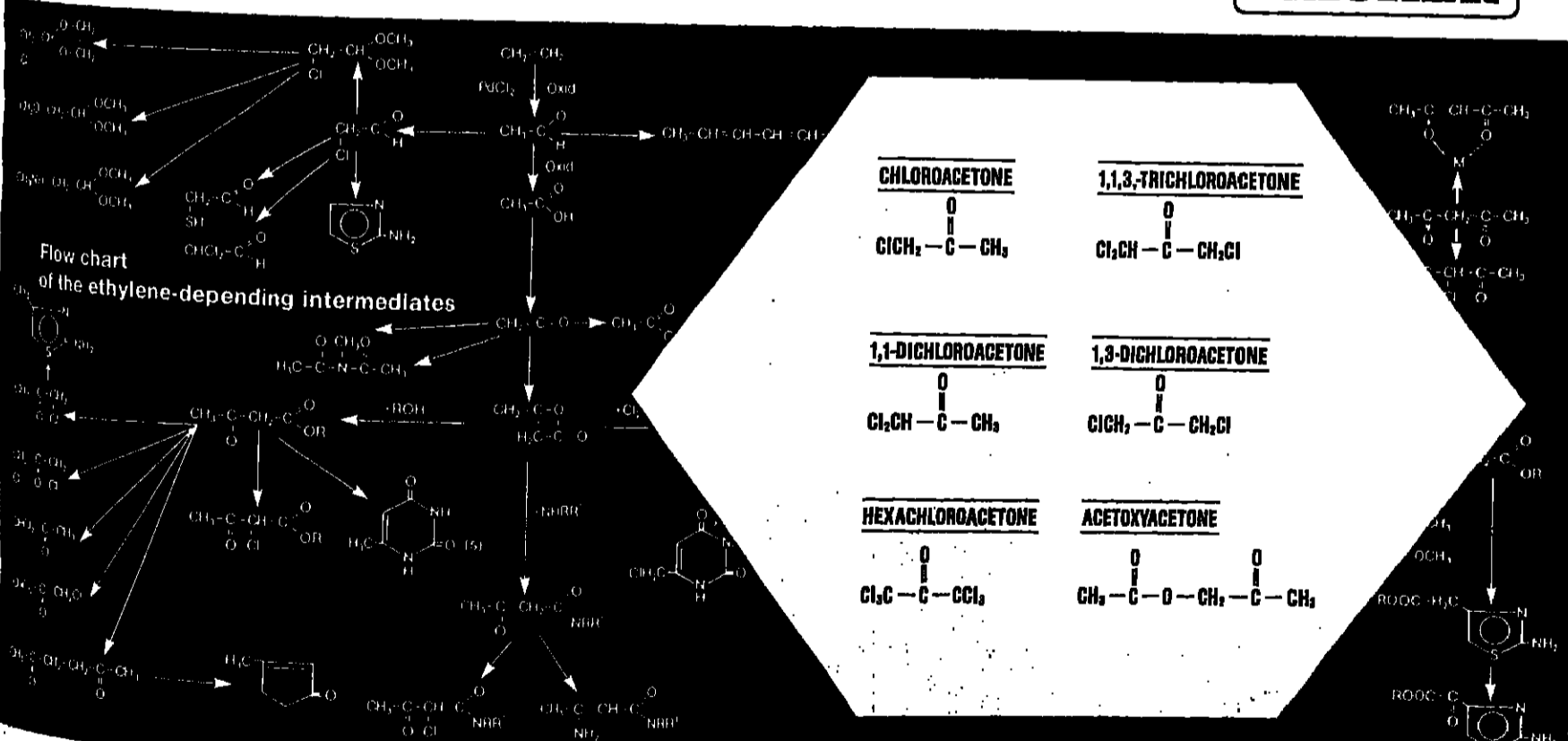
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Gas Pipelines' Market Share Under Study

Federal Energy Regulatory Commission says it will investigate to determine whether natural gas pipelines are using unregulated affiliates to dominate the market.

By a four-to-one vote, FERC asked for public comment on whether interstate pipelines are abusing their power in the wellhead market for gas. The commission has been attempting to open the market to all buyers and sellers.

Public comment will be due by Dec. 29, and any comments in reply would be due by January 28. A final vote will be taken on a finished order drafted by the FERC staff.

The commission also voted 4-1 to stop proceedings by an administrative law judge on a complaint by Champlin Petroleum, an affiliate of the Union Pacific Railroad. Champlin Petroleum has charged that Tenggascos, a marketing division of Tenneco Corp.'s Tennessee Gas Transmission Company, could receive unfair advantages in shipping gas.

Charles Trabandt, the dissenter in both votes, said he feared FERC would not be able to act before July, and by then marketing affiliates "can be expected to increasingly dominate natural gas transportation and, unless I'm wrong and I hope I am, exercise unregulated monopoly power."

The pipelines had monopoly power until October 1985, when FERC, prodded by a Federal court order, gave pipelines the option of becoming pure transportation companies rather than gas wholesalers.

A pipeline operating under the open access option simply carries gas. The pipelines' customers, local distribution companies regulated by the states and large industries, buy gas from the operator and have it shipped to

the burner. Most of the nation's gas is sold in this manner, compared with only a small percentage just over one year ago. Most of that is shipped by new pipeline marketing affiliates who buy gas and resell it. Some gas is shipped by customers, while some is shipped by more than 50 independent buyers.

Mr. Trabandt proposed an emergency regulation to prevent pipelines from giving their affiliates discounts on shipping charges and require all gas shipped by marketing affiliates to come under price controls.

Chemicals Act As Flavor Code

Orange juice has a "flavor code" of chemicals that a U.S. Department of Agriculture scientist has broken for the first time.

USDA's Manuel G. Moshonas has identified what he says are the 21 major chemicals that contribute heavily to fresh orange juice's distinctive flavor. That natural blend of chemicals is altered when the juice is stored or processed, he said.

"We found that the 21 chemicals act as a flavor code that will help the citrus industry make processed juice that tastes like it has been squeezed from an orange," he said.

"We're closing in on nature's way of making orange juice," said Mr. Moshonas, a chemist with USDA's Agricultural Research Service in Winter Haven, Fla. He said he plans to see if he can detect the flavor ingredients in other juices such as apple, pineapple and grape.

All 21 flavor chemicals were identified: orange juice known in the industry as "strength," which includes juice that is squeezed, juice that is pasteurized and packaged in cartons or bottles, and juice concentrate to which flavor ingredients and water are added.

What happens is that processors alter

chemical blend because when they make concentrate, they remove water and some of the flavor chemicals from the juice. Some of the juice water, called "essence," is added back along with other ingredients, partially restoring the flavor.

Still, the reconstituted juice does not have the same flavor it had when it came out of the orange, says Mr. Moshonas, who is based at the agency's Citrus and Subtropical Products Laboratory.

Until now, scientists had not been able to break the flavor code because the chemicals are in low concentrations, and the water and other components of the juice — sugars and acids, for example — make it hard for most instruments to measure the flavor ingredients.

Mr. Moshonas used a gas chromatograph to compare fresh juice with concentrate and to determine which flavor components have changed. He said the citrus industry is interested in his research and that the chromatograph, which costs between \$5,000 and \$8,000, would be economically feasible for the industry.

He also used low pressure and temperature to distill, or separate, the water and flavor components in juice from the solids dissolved in the juice. Once that was accomplished, he could then analyze the flavor by

using the gas chromatograph, which "separates and measures these ingredients so we get a picture of them and how they interact," he said.

About 90 percent of the 200 million boxes of oranges produced in the US each year are converted to processed products with a retail value of more than \$3 billion, according to May 1986 figures from the Florida Department of Citrus.

Vista Selling Shares

Continued from Page 9
through a management-led leveraged buy-out, was initially capitalized with about 90 percent debt and 10 percent equity.

Most of the equity portion of the capital — again about 90 percent — was initially in the hands of the financial backers including Huton, while the managers held about 10 percent.

The company's strategic plan was to pay back the debt rapidly, achieving a more normal 50 percent debt-capitalization ratio in five years or less. In an interview last year, company president John Burns said that when the debt is substantially paid down, Vista will either re-leverage itself, go public, be acquired or make a substantial acquisition of its own.

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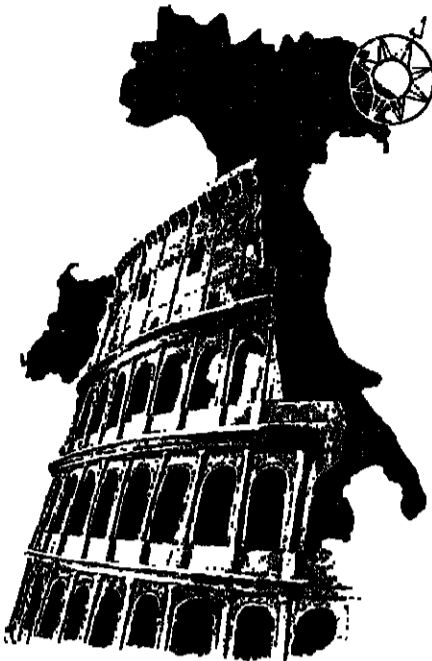
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DRUGS & FINE CHEMICALS

Two Hike Sorbates Price Following Increases by Mitsui

Two companies have announced price increases for sorbates, effective December 1.

Both Kanematsu-Gosho, distributor for Ueno Fine Chemicals, Inc., and Toyomenka (America) Inc., are raising their list prices for potassium sorbate and sorbic acid. Each company will be charging \$2.50 per pound for 20,000-pound or larger quantities, \$2.60 per pound for between 10,000 and 19,900 pounds, and \$2.70 per pound for between 3,900 and 9,900 pounds. Their prices differ slightly for lower quantities.

These announcements come on the heels of an announcement made by Mitsui & Company (CMR, 11/10/86, pg. 21). Mitsui's changes are similar, and also take effect December 1.

In most cases, prices are rising by 30 cents per pound. Much of the US sorbates supply is imported from Japan and Germany, and currency rates are being cited as the primary reason for the hikes. The three companies which have announced increases thus far sell Japanese material.

The industry still awaits the decision of other important players, namely the domestic producer Monsanto Company and the importer American Hoechst.

MONSANTO MULLS MARKET
A Monsanto spokesman says his company is evaluating market conditions, and will soon decide whether it will raise its prices also. An American Hoechst spokesman comments, "Present pricing for (sorbates) is unsatisfactory."

One company spokesman thinks that, in order for the price increase to hold, both Monsanto and American Hoechst have to raise their prices. "If they don't," he says, "we can't."

Another player, however, says that the price increase should hold even if the two companies do not follow suit, because of the strong need for higher prices.

Prices have been depressed, say sources, because of oversupply. One source estimates world capacity at 60 million pounds, but says that no more than 40 to 50 million pounds are being sold. Sources assert that Monsanto decreased its prices in early 1985 because of the oversupply, and say other suppliers were forced to follow.

Now, because of the currency situation, sources say profit levels are unacceptable. One source says, "We've had enough of the (price) war...We feel the pinch." Another source comments, "Price really fell last year... Profit margins were low."

Reflecting the currency exchange situation, imports have fallen in 1986 for both potassium sorbate and sorbic acid. Particularly, imports from West Germany have fallen considerably. Presumably, the

Japanese companies are so committed to the US market that currency exchange rates will not affect the flow of sorbates from Japan much as demand shifts.

Through September 1986, about 3.8 million pounds of potassium sorbate entered the US, almost 22 percent less than the 4.9 million pounds in 1985.

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

None

CHANGES/DOWN

None

DRUGS INDEX

The Drugs & Fine Chemicals index reflects the prices of 10 representative materials in this sector and the quantity of each produced in 1985.

Nov. 14, 1986	211.18
Nov. 7, 1986	211.18
Oct. 17, 1986	211.18
Nov. 14, 1985	211.18

Chemical Prices Start on Page 22

pounds coming here through September 1985. Material from Japan totaled 1.1 million pounds, about a 7 percent decrease from 1.2 million pounds in 1984. Material from West Germany, however, fell 1.4 million pounds, more than 30 percent less than the amount coming here through September 1985. Belgium sends a relatively small amount of potassium sorbate to the US, and that amount nosedived by 58 percent to 42,000 pounds, through September.

Overall sorbic acid imports are about 7 percent (3.8 million pounds versus 4.1 million pounds). Japan's shipments to the US through September remained stable at about 3.3 million pounds. West Germany exports here were 457,000 pounds, a decrease of 47 percent from last year. Mainland China sent 79,000 pounds to the US through September. Last year it sent nothing.

US demand for sorbates is estimated at 10 million pounds by one source. Others say the total is slightly lower. Growth is between 3 and 5 percent annually. One source notes good sales of semi-moist pet food demand booster.

Several sources agree that the industry will have to wait until mid- or late-January in order to assess the effects of the price increases, and to determine whether more price increases will be necessary.

GUAR GUM — Indian Gum Industries Limited, of Bombay, India, has announced

DRUGS & FINE CHEMS

pointed Commodity Services International, Inc., as its exclusive sales, marketing and distribution agent for guar gum and its derivatives in the US. Commodity Services International is located in Easton, Md.

Indian Gum Industries is said to be the largest producer of guar gum products in India, with manufacturing facilities in Bombay, Ahmedabad and Jodhpur. The company says its annual production of these products is more than 12,000 metric tons. Indian Gum Industries is affiliated with Hercules Incorporated.

Guar gum supplies have dwindled this year, because of last fall's poor crop in India and Pakistan, the world's largest producers. This season's crop will not see any improvements, according to a supplier.

Guar gum's crop is beginning to peak about now. Estimates of the crop's potential range from 11,000 tons to 68,000 tons, far below the average crop of about 137,000 tons. Last year's crop yielded 68,000 tons, so at best this year's crop would equal that total.

The only factor preventing a catastrophic shortage, the supplier says, is the "unbelievable petroleum disaster," (CMR, 8/11/86, pg. 19). He claims that the past year has seen the petroleum industry's great demand plummet to 600 metric tons, from 4,500 metric tons.

VITAMIN B-6 — A recently completed study by USDA Agricultural Research Service and Columbia University scientists indicates that vitamin B-6 helps ease some symptoms of bronchial asthma. For example, B-6 is now thought to help control shortness of breath.

Dr. Robert D. Reynolds, a chemist for ARS who was involved in the research, says that during the two-year study, 15 asthma patients were given 100-milligram doses of vitamin B-6 daily. He claims that initial results show a relationship between low levels of vitamin B-6 and asthma, and that all involved in the study have experienced fewer and less severe asthma attacks.

Dr. Reynolds cautions that 1.5 to 2 milligrams per day of vitamin B-6 is the normal intake, and that excessively high doses can cause serious nerve damage.

Meanwhile, the vitamin's price has re-



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BUREAU OF CENSUS FIGURES ON THE KEY DRUGS.

	SEPTEMBER	SEPTEMBER	AUGUST
	QUANTITY	\$ VALUE	QUANTITY
Antibiotics:			
Amphotericin and salts, bulk	5,541	747,088	238,868
Erythromycin	68,780	8,006,974	73,180
Penicillin HSPF	7,374,188	1,216,834	1,890,126
Penicillins, G Salts, Bulk	143,243	2,898,021	84,351
Tetracycline	1,236	1,455,411	2,008
Aspirin	274,008	385,182	254,515
Caffeine and deriv.	35,300	190,825	64,082
Citric acid	668,935	827,655	436,868
Optical isomers and deriv.	592	89,329	2,076
Hormones:			
Corticosteroids, napf	3,112	6,465,273	10,484
Nonsteroid hormones	14,652	1,305,298	8,429
Prostaglandins and esters salts	3,342	4,191,280	4,908
Steroid hormones and synthetic	22,382	2,113,885	126,918
Sulfonamides, bulk	102,812	1,424,282	70,487
Vitamins:			
Ascorbic Acid	194,884	658,483	61,188
Vitamin A and Pro-vitamin A, bulk	180,281	207,686	72,326
Vitamin B ₁ (thiamine)	6,954	52,184	4,184
Vitamin B ₂	1,054	26,534	62,003
Vitamin E	86,110	1,127,744	1,491
D and D ₁ pantothenic acid	2,848	22,452	28,018
Niacin and niacinamide	46,935	148,840	70,708
Vitamins, napf	395,095	807,265	292,256

cently been increased by several major companies (CMR, 11/10/86, pg. 21).

BRUCINE SULFATE — Reportedly, the Indian government is considering raising the price floor of brucine sulfate.

The current price floor of the Indian import is \$2 per ounce, i.e., Indian ports. The floor was established to encourage farmers to grow the nux vomica plant, from which brucine sulfate is extracted. Before the floor, farmers complained about high production costs.

Now, the floor may be raised again for similar reasons. An importer of the product says that talks have taken place recently, but adds that no change has been made. In the meantime, the importer claims that some suppliers have been squeezed out of the market because of low returns.

The selling price of brucine sulfate is between \$2.25 and \$2.30 per ounce, for large quantities. US demand is estimated at about 400,000 ounces a year, and is said to constitute the bulk of world demand.

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- 2-(2-diethylaminoethoxy) ethanol
- (2-chlorophenyl) phenylmethanol

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- 1-4-dibromobutane
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- 1-(bromomethyl)-2-methylbenzene
- 1-(bromomethyl)-4-tert-butylbenzene

CHLORIDES

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- 1-phenylcyclopentanecarbonyl chloride
- 4-phenyltetrahydropyrane carbonyl chloride
- 10-(1-chloro-2-methylpropyl) phenothiazine
- (p-chlorophenyl) phenyl chloromethane

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- 1-phenyl-1-cyano-cyclopentane
- 4-phenyl-4-cyano-tetrahydropyrane

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Insects Pests Targetted

Continued from Page 4

nales in that part of the insect's brain which controls the release of certain hormones from the insect's glands.

Methoprene stops an insect's maturation process in mid-stride and prevents it from propagating. Again, methoprene disrupts the insect's specific hormonal system.

The action of both chemicals is fundamentally different from conventional insecticides because death results from more subtle actions on behavior or development.

Dr. Adams explains how the insect brain works: "In insects, the brain is a central command post which programs developmental, reproductive, metabolic and behavioral states at the appropriate times throughout the body. The brain does this by issuing chemical messages called neurohormones from specific nerve cells, which, in turn, orchestrate the precisely timed liberation of blood-borne hormones from glands."

The activities controlled by these hormones—such as changing from larvae to an adult form—are unique to insects.

"By focusing on insect-specific neurohormones, Dr. Adams says, "it is hoped the problems of general toxicity to non-target organisms will be avoided."

Today's conventional crop protection insecticides are neurotoxins, Dr. Adams says, and these are designed to upset the delicate regulation of neurotransmitters within the brain.

"Unfortunately," he says, "they are general toxins affecting brain chemicals common also to non-target organisms, hence the high risk associated with their use."

While recent improvements in the design of conventional insecticides have lessened this risk, Dr. Adams says, the goal of future insecticide research is to focus on those aspects of insect life that are unique to insects. This would increase the margin of safety for non-target animals.

But getting mind-linking chemicals into the insects can be a problem, says Dr. Adams. Their tough outer shells pose a formidable barrier for some promising insecticides to penetrate.

Dr. Adams says one solution would be to have a disease-causing agent deliver the pesticide. The agent would attack only insects, and would deliver a neurohormone at just the wrong time in an insect's life cycle—for instance, interrupting an insect's molting process at its most vulnerable stage, when its new outer shell has not yet hardened.

Dr. Adams says both bacterial and viral disease-causing agents, pathogens, already are being used with some success in insect control.

German Chemicals

Continued from Page 5

will be making an important contribution to the growth of the overall economy.

He sees some clouds on the horizon, however, notably in the US, which has not been economically stimulated by the decline of the dollar. Among other problems, he cites the massive budget deficit.

"Also, the economic situation of Japan is especially insecure today," he says. "Negative influences on exports and weak overall investment level are strengthening recession tendencies in that country, he warns."

It's true that West Europe is not as directly affected by US economic weakness and the devaluation of the dollar as Japan, "but as

German Chemical Output

	January-August 1985	1986
Chlorine	2,372,823	2,321,599 -21
Sulfuric Acid (SO ₄)	2,309,838	2,252,425 -23
Ammonia	1,306,278	1,135,629 -13
Ethylene	2,125,015	1,828,675 -13
Methanol	384,348	321,965 -16
Nitrogen		
Fertilizers (N)	780,575	695,822 -10
Phosphate		
Fertilizers (P ₂ O ₅)	326,693	256,526 -21
Fungicides, Herbicide	112,752	111,585 -1
Polyethylene	860,525	865,182 +1
Polyvinylchloride	812,636	825,917 +1
Paint Material, lacquers		
Thinners	902,874	895,033 -1
Pharmaceuticals	10,515,545**	10,266,167 -2

Source: Verband der Chemischen Industrie
*Figures are tons except where indicated otherwise
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strongly export-oriented" an industry of German chemicals "can't look unaffected by the impact on the growth of the world economy."

In other remarks to the VCI press conference Dr. Albers expressed concern over the rising chorus of environmentalist calls in Germany for more regulation of the chemical industry and the need to reduce business taxes in line with those on other major leading partners. He sees a "long-term danger" if current business taxes go beyond today's level at 70 percent of profits or higher.

Waste Cleanup: Labor Seeking An Interim Rule

Occupational Safety & Health Administration should issue a comprehensive interim standard to protect all workers involved in hazardous waste cleanup operations, organized labor said last week.

The superfund reauthorization bill signed into law by President Reagan October 17, requires OSHA to issue an interim rule by December 17 and a final rule within a year.

OSHA says it will issue the interim rule by the mandated deadline and simultaneously issued a proposed final rule, which will be subject to public comment.

AFL-CIO safety specialist Margaret Seminario calls passage of the superfund bill a "real victory for the labor movement" and says organized labor is "glad to see OSHA moving forward on this."

She emphasizes however that workers need a "comprehensive rule that protects all workers in hazardous waste sites." Ms. Seminario notes that superfund is "very specific" about who should be covered.

"The intent of Congress is clear in the language and in previous testimony that all workers at hazardous waste operations be covered," she says. "This goes beyond just workers at the superfund cleanup sites. Some of the most hazardous sites for workers are at managed sites where waste chemicals are handled, processed or buried," Ms. Seminario adds.

She says OSHA's proposed standard should set specific exposure limits for the chemicals

that workers may be exposed to in waste operations, using both short-term limits and permissible exposure levels averaged over a workday when both are needed.

"It will depend on the type of operation and the chemicals involved," she explains.

Superfund also authorized the National Institute of Environmental Health Sciences to fund university-based programs on health-effects research and on worker training.

Ms. Seminario says the NIEHS training program and the OSHA standard on toxic waste sites are interrelated, and adds she hopes the training programs developed are consistent with the OSHA requirements.

A key to the effectiveness of the NIEHS worker training program will be making sure Environmental Protection Agency earmarks the \$10 million per year required to fund the operation, she says.

Borg-Warner's Unit

Continued from Page 9

the large amount of capital employed in the financial operation for growing other Borg-Warner businesses, according to Clarence E. Johnson, president and chief executive officer.

First Boston Corporation, which was retained by Borg-Warner in 1984 to advise it on restructuring, will assist in the sale of the financial operation, Mr. Johnson stated.

This is the second planned divestment announced by Borg-Warner within a month. On October 27, the company said it intends to sell its industrial products subsidiary, which had sales of \$273 million in 1985.

Proceeds from both sales will be available for expanding other businesses, for acquiring companies that blend with the company's mainstream operations and for repurchasing its shares.

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EDB Ban Poses

Continued from Page 7

ban further shipments. A Federal court in Kansas on November 5 approved an arrangement allowing EPA to store the rest of the can's inventory until a recycling system becomes operational next September.

As a result of the problem at Valco's warehouse, Mr. Campt said the agency is advising all EDB holders to inspect their drums for leaks.

But documents released at the hearing by Rep. Mike Synar (D-Okla.), subcommittee chairman, indicated that EPA was aware of corroded or leaking drums as far back as 1984 at warehouses in three other states.

EPA officials now estimate that as much as 50 percent of the remaining stocks of EDB may have leaked.

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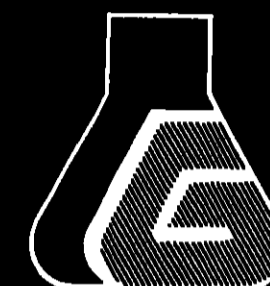
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Supreme Court

Continued from Page 7

deformities in Katie Wells, including a deformed right hand, no left arm and partial development of her left shoulder.

The judge awarded her parents \$5.1 million for medical expenses, pain and suffering and lost wages. In May 1986, an appeals court upheld the judge's finding but reduced the award to \$4.7 million.

Appealing to the high court, attorneys for the drug company said the trial judge and the appeals court used an improper standard for evaluating evidence in a scientific case. They said objective data fail to establish any clear link between spermicides and birth defects.

"With the exception of the plaintiffs' experts in this case, no scientist has ever publicly expressed the opinion that vaginal spermicides cause birth defects," the appeal said. Opposing the appeal, lawyers for the child and her parents accused Ortho Pharmaceuticals of seeking to "re-try the merits of its case." They said Ortho "has had its day in court" and lost after "a procedurally perfect trial."

Following a two-week trial in which both sides presented expert witnesses, Judge Shoob ruled in favor of Katie Wells' parents. He said they presented "competent and credible" medical evidence that showed "to a reasonable degree of certainty" the spermicide caused the defects and that the pharmaceutical company was negligent for not warning of the danger.

Thirteen studies were entered in evidence during the trial and two of them were singled out by the judge as demonstrating an association between spermicide and birth defects.

The case has prompted concern in the pharmaceutical industry and debate within the medical community over standards to be used by judges considering medical evidence.

Recently, Drs. James Mills and Duane Alexander of the National Institute of Child Health and Human Development said it demonstrates that lawsuits can be won with

evidence rejected by the scientific community.

The pair, writing in the New England Journal of Medicine, said, the decision "took the medical community by surprise because the overwhelming body of evidence indicates that spermicides are not the cause of birth defects."

Water Act Veto Hit

Continued from Page 4

mously in favor of the bill, which would have extended terms of the Clean Water Act through 1994 by providing money for local sewage treatment and initiating programs to curb toxic chemical pollution.

Sen. Daniel Moynihan (D-N.Y.), said President Reagan's signature on the bill passed the final days of the 99th Congress would have been seen as a "first gesture of cooperation" with the Democratic leadership of both chambers when the 100th Congress convenes in January.

Sen. Edward Kennedy (D-Mass.), warned bluntly, "The President's veto of the clean water bill was an irresponsible act. We will not allow these projects to be delayed for long." Sen. Kennedy warned, "We will be back next year and we intend to prevail with a similar bill."

President Reagan promised to work with the new Congress in addressing such concerns, saying the bill he vetoed would have authorized certain new programs for \$50 million "that my administration has opposed."

Among them, he said, is "reinstatement of a Federal assistance program to pay for local projects to control diffuse sources of pollution."

President Reagan, who reported "tremendous progress in the massive cleanup effort," said the bill's \$18 billion price tag was triple the amount he requested.

The chemical industry regarded the legislation as an acceptable compromise and urged the President to sign it into law.

Biotech Center Is on the Way

Officials last week broke ground for the nation's first biotechnology research center at Rockville, Md.

Construction for the Center for Advanced Research in Biotechnology in Rockville formally began with ceremonies involving representatives of the major participating institutions. The center — established by the University of Maryland, the Department of Commerce's National Bureau of Standards and Montgomery County, Md. — will be located at the county's Shady Grove Life Sciences Center. Biotechnology companies are expected to join in CARB's research, a spokesman said.

"This center represents a unique national resource in an especially important scientific field that will also strengthen the biotechnology-related programs of NBS and our university," said John S. Toll, president of the University of Maryland, in ceremonies at NBS to celebrate the groundbreaking.

Associate deputy secretary of commerce Mark Polciniski emphasized the economic importance of biotechnology. "The more than 400 biotechnology firms which have emerged over the past few years attest to the promise this field holds," he said. "But we must continue our strong research support for biotechnology and find better ways to transfer research advances to the many small and large firms which make up this new industry," he said.

Ernest Ambler, director of the National

Bureau of Standards, stressed the mutual benefit expected from CARB. "This nation must increasingly turn its attention to cooperative ventures like CARB in order to make the most of our national investment in research and development," he said. NBS, the Federal government's science and engineering measurement laboratory, provides industry and science with physical and chemical measurement methods, data, and standards.

First announced in 1984, CARB now is putting together multidisciplinary teams of scientists and engineers with state-of-the-art facilities, according to Kevin M. Ulmer, director of the center. The organization has been housed at NBS, where researchers from the bureau and the University of Maryland have undertaken several research projects taking advantage of specialized NBS laboratories.

When the new CARB building is ready in December 1987, it is expected to accommodate 100 researchers. Between 65 and 90 scientists from NBS and the University of Maryland will work at the new site. The remainder of the 100 researchers working at the center will be guest scientists and engineers from industry, other universities, and government agencies. Up to one-third of CARB's research staff will be visiting industrial fellows. Both cooperative and proprietary research will be possible at CARB.

The initial 40,000 square-foot complex under construction "will be the world's finest facility for the determination and analysis of the structure of macromolecules," Mr. Ulmer said. "Our goal is to radically reduce the time and effort required to determine the atomic structure of proteins and to model and predict their properties," he said.

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Fertilizer Shipments

Continued from Page 5

solid urea remained unchanged from last year.

Ammonium sulfate exports advanced 135 percent for the period, followed by ammonium nitrate with a 12-percent rise. Anhydrous ammonia and urea exports were off 28 percent and 39 percent, respectively.

Processed phosphate disappearance declined 4 percent in September compared to September 1985, but rose 3 percent for the three-month comparison. Superphosphoric acid disappearance for the same period was off 34 percent and concentrated superphosphate shipments fell 16 percent, while monoammonium phosphate disappearance rose 25 percent.

Production for the month was up 7 percent compared to September 1985 but off 7 percent for the period. Year-to-date figures show that production dropped for all phosphate products except normal superphosphate, which remained unchanged from 1985 levels.

Ending inventories for processed phosphates were down 4 percent, due to declines in stocks of superphosphoric acid, normal super phosphate, monoammonium phosphate, and diammonium phosphate. Wet process phosphoric acid stocks rose 29 percent.

Phosphate exports posted increases of 9 percent for phosphoric acid, 20 for normal superphosphate, 11 percent for concentrated super and 1 percent for DAP. Phosphate rock

and monoammonium phosphate exports were off by 30 percent and 23 percent, respectively.

Domestic disappearance of potash products rose 5 percent for September but fell 1 percent for the three-month comparison. Granular muriate disappearance jumped 10 percent compared to September 1985 and 11 percent for the year to date. Standard muriate shipments were down 8 percent and coarse muriate down 17 percent relative to the same period a year ago.

Production for the year to date rose 18 percent compared to last year, led by granular muriate's rise of 53 percent.

Monoclonals

Continued from Page 7

dipstick diagnosis of disease. In this process, plastic sticks would be coated with monoclonal antibodies, dipped in the body fluids of a stricken animal, then rinsed in a series of short baths. The cause or causes of the problem would be pinpointed by characteristic color changes on the dipstick.

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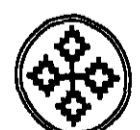
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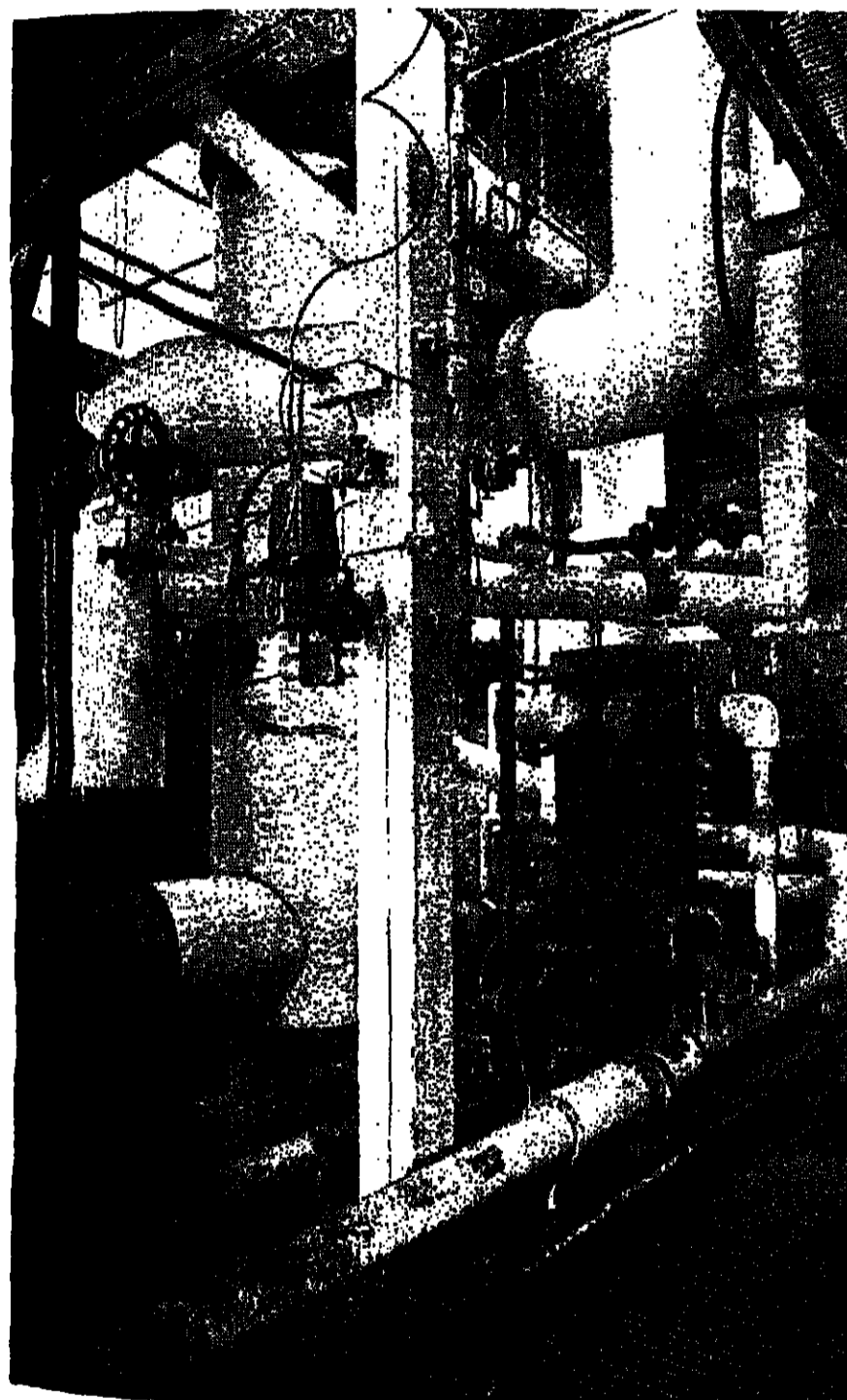
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WASTE
MANAGEMENT '86

Waste Reduction Coming to the Forefront



Reducing Waste Output at Source
Is Viewed as an Industry Priority,
But a Systematic Approach Is Needed

By AGNES SHANLEY

The cost of enforcing and complying with current hazardous waste legislation is forcing both the US government and the chemical industry to take a closer look at waste reduction at source, the most fundamental approach to waste management.

This response to the problem of hazardous waste disposal allows companies to meet environmental pressures and satisfy stricter Federal and state requirements while substantially lowering long-term costs.

Although environmentalists, government agencies and industry leaders have all voiced unanimous support for this approach, many feel that the US chemical industry has yet to put any systematic approach into action. A major obstacle, they say, is current environmental legislation, which centers on waste handling and treatment rather than reduction, diverting corporate attention and capital from developing innovative approaches to waste reduction.

ONLY STOPGAP SOLUTIONS

The Congressional Office of Technology Assessment (OTA) in its report, "Serious Reduction of Hazardous Waste", estimates that 99 percent of almost \$70 billion spent annually by Federal and state governments goes into controlling the aftereffects of waste generation. The options which chemical companies most often resort to—waste processing, recycling, and incineration—sometimes represent only stopgap solutions to the waste disposal problem, where one form of waste is exchanged for another, often at considerable cost.

Inform, a non-profit environmental research group, says preventative measures are often the option of last choice, implemented only after regulatory and operational pressures force management's hand.

Both OTA and Environmental Protection Agency have recently expressed strong support for developing a widespread strategy for waste reduction at source. EPA estimates that at least one-third of the 1.4 billion tons of hazardous waste generated by American industry could be eliminated if a more systematic approach to prevention were adopted throughout industry.

EPA's plan calls for the development of a national database on hazardous waste reduction techniques and an industry education program where companies would receive technical assistance to help them realize waste reduction goals.

Similarly, OTA has advocated waste reduction legislation, and the establish-

Industry and government leaders agree that more attention needs to be focused on waste reduction at source. As part of its waste reduction program, 3M uses a vapor compression evaporation system, shown at left, at its "Chamotte" plant to recover ammonia from its waste stream. The ammonia solution recovered is sold as fertilizer, generating annual revenue, while preventing the discharge of 677 tons of pollutants annually.

Waste Management: an Industry Imperative

WASTE REDUCTION: Companies need to adopt a systematic approach to reduction at source Page 31
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PCB'S: Disposal techniques must jump through many regulatory hoops Page 42

WASTE MANAGEMENT '86

WASTE REDUCTION

ment of detailed corporate reporting procedures, grants and incentive programs, and a national voluntary goal of 10 percent hazardous waste reduction per year.

Many of the major chemical companies have developed or are developing management strategies which focus on reducing waste at source, recycling or reclaiming what cannot be eliminated, and using incineration for most of the balance. This new approach involves using outside waste management firms for less than 5 percent of the total waste volume, with a minimal dependence on landfill and underground injection storage.

Chemical Manufacturers Association's latest hazardous waste survey indicates that progress in reducing waste has been made. Comparing results from the 324 plants which

responded to the survey each year from 1981 to 1984, overall waste generation fell 16 percent over that period, with landfill disposal down 35 percent; the amount of NPDES-treated wastewater fell 19 percent, while incineration increased 13.3 percent.

With three more plants contributing to the 1984 survey, results showed the total amount of hazardous waste fell 8 percent from 1983 to 1984; treated wastewater generation fell 27 percent over the same period, and NPDES-treated wastewater fell about 10 percent.

Survey results, while an indication of the overall industry trend, are still not conclusive; there is an inadequate amount of data available. Since chemical companies are still not required to keep track of the total amount

of hazardous waste generated in its three major forms, and many view their waste reduction practices as proprietary, the actual degree of waste generated and the success of waste reduction efforts cannot be definitively determined. Government records, reflecting the focus on waste treatment, are also incomplete.

In its study, "Cutting Chemical Waste", Inform chose 29 organic chemical plants in California, New Jersey and Ohio, the top hazardous waste-producing states, to analyze the effects of Federal and state laws on waste reduction.

The group found that waste reduction was implemented at only 12 of the 29 study plants. More than half of the 29 companies, among them the largest producers, elected not to participate in the study. Inform found

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John C. Little

WASTE MANAGEMENT '86 CLEAN SITES

Clean Sites' Mission Now Well Under Way

By STEPHEN KEARNEY

Clean Sites, Inc., the independent, non-profit corporation established in May 1984 to facilitate the cleanup of abandoned hazardous waste sites, is currently involved in about 45 sites throughout the country, and has made contributions towards the settling of a cleanup at about 20 sites.

CSI president Charles Powers says that "much of the original mission is well underway. We have helped responsible parties and EPA develop models." He adds, "We have become more central to the settlement process than we could have ever hoped."

Lee Thomas, Environmental Protection Agency Administrator, commented this year that Clean Sites "has facilitated very positively the process of cleaning up hazardous waste sites."

CSI in July completed its first project, a \$0.5 million cleanup of a PCB-contaminated site involving two warehouses and 11 trailers in Greensboro, N.C. The organization assisted in bringing about the settlement at the site and managed the cleanup (CMR, 7/7/86, p. 3).

In June, CSI was involved in the achievement of a settlement at a portion of a defunct waste disposal facility in Oswego, N.Y. The agreement between 38 companies and the EPA resulted in a \$900,000 interim cleanup of the Clothier "satellite" site, where the potential for drum leakage had been discov-

ered. A similar agreement was reached recently at Fulton, another satellite of the Oswego area site.

In Motco, Tex., CSI undertook a technical assessment that is expected to contribute to a settlement by year's end. A notable aspect of this site involves the role of superfund money to cover a portion of the cleanup costs as an inducement for responsible parties to settle. Under this mixed funding program, EPA can sue potentially responsible parties that do not settle to cover the superfund share.

CSI is involved in the early stages of work at a Holden Mo., PCB waste site. Working with a subcontractor, Joan Ebbery a Clean Sites spokeswoman, says, "we already have secured the site, built a fence, drained some pits, and done preliminary sampling." To promote positive relations with the city, Clean Sites held a meeting with the mayor of Holden and some 50 concerned community members. The organization is reviewing documents that should enable it to determine the site's contributors.

Members of CSI's technical staff frequently are engaged in preparing and reviewing remedial investigation and feasibility study papers (RI/FS) that are generally required for Superfund sites. These studies analyze the extent of contamination, the effects on air and water, the dangers posed to health and environment, and the effectiveness and costs of various cleanup options.

For instance, Clean Sites has assisted in the preparation and validation of an RI/FS

for a site in Connecticut. The organization says that its technical review broke an impasse at the site, enabling the potentially responsible party to reach an agreement with the Connecticut Department of Environmental Protection that resulted in a limited surface cleanup of the site.

At an Elkton, Md., location, Clean Sites built a data base holding more than 8,000 receipts and manifests used for quantifying wastes sent to the site and allocating costs. CSI helped responsible parties and EPA agree to prepare a revised RI/FS at the site, and played a role in the parties' reaching an agreement on carrying out an initial cleanup phase.

CSI points out that it has the capability to help parties execute all phases of cleaning a hazardous waste site: technical evaluation, cleanup cost allocation, negotiations leading to a settlement, and the actual cleanup itself.

Miss Ebbery says that "most of our work is focused on bringing parties together, and on helping them to allocate cleanup costs among themselves and come to an agreement with whatever government they are dealing with."

While Clean Sites may be asked to get involved in just one aspect of a cleanup situation, the organization believes that sites can be cleaned faster when most or all of the stages in the cleanup process are integrated.

At the Greensboro, N.C. PCB site, CSI drew up a cleanup plan and solicited bids for the work while negotiations toward a final settlement were in progress. This was made possible by an interim agreement on the allocation of cleanup costs among 15 responsible parties. The final settlement was simpler to reach once the selection of a contractor made the cleanup cost a known factor, CSI asserts.

In order to promote an integrated approach to waste cleanup, Clean Sites sends at least one person from each of its three main divisions—settlement facilitation, technical review and compliance and project management—to each site.

Clean Sites believes that its position as a neutral, non-profit participant better enables it to help remove obstacles in the cleanup process. The organization can deal with concerned parties in joint negotiations and individually to work at moving them toward a common ground.

CSI generally uses two-person teams in the settlement process, one of whom typically has a legal background while the other has a managerial or technical background. Often, one has private sector experience and the other is from the public sector. Approximately 40 percent of Clean Sites' professional staff comes from the private sector, while 35 percent is from the public sector and 25 percent has experience in both areas.

At the Clothiers, N.Y., site, the organization assisted in the allocation of costs and in settlement negotiations. EPA in this instance set aside a portion of the cleanup costs for non-settling parties to be responsible for, and issued a unilateral order under the standard

of joint and several liability to each settling party, with the potential for trouble if they failed to conduct the work. Within 30 days of EPA's announcement, the number of parties willing to settle was approximately doubled, and an emergency cleanup was able to proceed.

"At the very outset, a portion was designated for the recalcitrants," observes Clean Sites' Ebbery, and this contributed to "a very high percentage of participation" by potentially responsible parties.

With sites such as Clothiers, CSI believes it is helping to establish models for saving valuable time and resources and protecting the environment from further harm. Pointing to the quick Greensboro, N.C., cleanup, CSI Powers says that it is possible to save "tens of millions of dollars in transaction costs, litigation and pre-litigation posturing."

Parties often "feel they'll be in a loss in a fifteen-year morass," Mr. Powers cautions, "but if they can sense a light at the end of the tunnel, this allows them to go ahead and make a commitment. The government does not need to get bogged down in litigation, and the community senses it is part of a solution."

CSI gets involved with a cleanup upon the request of a participant at the site. EPA, responsible parties, or concerned community leaders may contact Clean Sites. The organization receives three requests a week on the average, and has thus far assessed about 150 sites, 60 of them in depth.

Clean Sites says it is most likely to take work at a site where it believes its involvement will hasten the cleanup or where the situation could serve as a model for other cleanups. Some sites not listed on the National Priorities List (NPL) have been turned down, as have sites with no known responsible parties. Clean Sites has withdrawn from only one site in which it did become involved.

CSI's financial sustenance continues to come from corporate sponsors and private foundations. The organization is reimbursed by responsible parties for its work at so-called NPL sites, but not at the major superfund NPL sites, where EPA is the indemnifier except for project management tasks.

Clean Sites aims to become more self-sustaining, says Miss Ebbery, and has asked EPA to revise its indemnification so that the organization can be reimbursed for its expenses in facilitating the allocation of costs among responsible parties. Long term, most resources must come from interested parties at a site while independence and neutrality are preserved, says CSI's Powers. Non-NPL sites are a testing ground for this, he adds.

In the months to come, Mr. Powers continues, CSI will continue to stress the importance of fairness and cooperation in expediting cleanups. "There is a very strong sense (among responsible parties) that they shouldn't pay more than their fair share. With an experienced staff and independent outlook, Clean Sites aims to ensure that equitable settlements are reached."



CLEAN SITES: Workers at the Holden, Mo., site sample for PCB contamination in a creek bed on a 13-acre property. Clean sites has been active in cleanup efforts there.

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WASTE MANAGEMENT '86 INCINERATION

Incineration Capacity Is Facing a Shortfall

By MICHAEL MCCOY

The viability of hazardous waste incineration methods has long since been demonstrated. Now even its necessity is apparent and the construction of commercial and private incineration facilities is beginning to proliferate. Some fear, however, that regulatory snarls will create a shortage of incineration capacity as new regulations ban the landfilling of hazardous waste.

Interest in incineration as a waste disposal method intensified with passage two years ago of amendments to the Resource Conservation & Recovery Act. Among other things, the RCRA amendments require small waste generators to comply with the law. Most significant, land disposal will be virtually banned under the RCRA amendments within another 3 1/2 years.

Based on the effects of the RCRA amendments and additional superfund wastes, EPA estimates that by 1990 demand for liquid

organic waste incineration will increase seven to eight times over commercial and private capacity now available.

As a result of RCRA, continuous waste generators are beginning to look for disposal methods other than landfilling. Says James Nicotri, manager for incineration systems at the Baltimore-based consulting firm, Environmental Elements, "We saw a dramatic increase in the number of inquiries after November 1984, when the government passed the RCRA amendments."

Interest in incineration is one thing, however, and obtaining a final RCRA "part B" permit to actually operate an incinerator, is another. According to EPA, out of 225 working incinerators in the country, only 35 have final permits. Out of the 225, 31 are considered off-site "commercial" incinerators, not connected with a particular waste generator.

According to Suellen Pirages, director of the Institute of Chemical Waste Management (ICWM), an industry trade group, none of these has obtained final RCRA approval.

It is this approval which is necessary be-

fore any new incineration facilities can be built. Dr. Pirages believes that a waste disposal capacity shortage is developing, and says that ICWM's "biggest concern is to get the permitting process to operate more expeditiously."

Bob Reincke, manager of public affairs at Chemical Waste Management Inc., a major waste disposal firm, is more blunt: "The net effect (of the current regulatory situation) is the potential for a significant shortfall in incineration capacity if new incinerators cannot be permitted and placed in operation."

Similar stumbling blocks exist for companies geared to the clean-up of abandoned or inactive landfills. With the exception of superfund sites, incineration companies pursuing this "mobile" clean-up market must endure the same extensive RCRA permitting process as required for permanent incinerators. Operators lament that the permitting process can take much longer than the clean-up itself.

For superfund sites, actual RCRA permits are not required, although RCRA emissions standards must be met.

Significant changes in the mobile incineration permitting process cannot be made until 1988 when RCRA comes up before Congress for reauthorization. An EPA official says the agency is now talking to industry to see what its case is for a departure from the current site-by-site permitting procedure.

Until then, he says, "We're taking a look at possible changes under the current regulatory framework." One possibility is a sort of "generic permit" a state would issue to a company for clean-up within the state. Every site would have to be listed, however, with specific corrective action conditions outlined for each. "This would provide some opportunity for streamlining," he says, but admittedly, "not as much as industry would like."

Despite the formidable challenge, disposal firms are forging ahead in the incineration business. The most tangible reason for their perseverance is financial reward. Harry Conger, President and CEO of Waste-Tech Inc. of Denver, Colo., estimates the market for disposal of continuously generated waste was \$1.5 billion in 1985, and predicts it will grow close to 25 percent annually for the next five years.

Considered by many to be a model for the industry is Chemical Waste Management Inc., which operates a commercial rotary kiln incinerator in East Chicago, Ill., and a fixed hearth incinerator in Saugeit, Ill.

At present the company has obtained permitting for and is expanding its Saugeit operation; the second unit should be operating by year end, says CWM's Reincke.

In addition, the company has applied for permits to add incineration capacity at treatment centers in Emelle, Ala., and Port Arthur, Tex.

Another promising company is Waste-Tech, which offers on-site fluidized-bed incinerators to continuous waste generators

through what it feels is a unique three step process.

Waste-Tech begins by analyzing a generator's waste stream at its EPA permitted pilot incinerator in Golden, Colo., says Mr. Conger.

Waste-Tech will next bring a demonstration unit to the company's plant location for two or three month trial burn. Mr. Conger feels this step makes Waste-Tech unique because the demonstration period proves to the customer the fluidized bed system's safety and reliability.

In addition, says Mr. Conger, the research development and demonstration permit required before operating the demo unit is the a short version of the final "part B" permit.

The final step for Waste-Tech is actual construction of the commercial unit. Here Waste-Tech offers four different programs, ranging from one where Waste-Tech will own and operate the facility to one where the company involved will buy the incinerator and run it itself.

While Waste-Tech has been building general waste incinerators since the 1970's, the fact that none of its hazardous waste incinerators are yet in operation is not surprising, very few anywhere have come on line since 1980.

Mr. Conger says that so far, five major chemical or refining companies have run sample burns in Golden, Colo. Two of these are ready for the on-site demonstration phase; and for one, a chemical company to the Gulf Coast, construction on an actual incineration unit has begun, with start-up scheduled for mid-1987.

Another outfit enjoying success is Environmental Elements, which is the North American licensee of Von Roll Ltd., Swedish developer of a popular rotary kiln incinerator design. Environmental Elements is based in that it works with both commercial and private concerns.

Among other projects, the company is involved with PPG Industries in Ohio in the construction of an incineration facility geared to PPG plants in that region of the country. Start-up here is slated for late Spring or early Summer 1987.

Environmental Elements is also working with a commercial operator, Waste Technology Inc., to build a treatment center in Liverpool, Ohio. While preliminary EPA permits have been secured, actual design will begin early next year, with start-up about three years later.

Mr. Nicotri of Environmental Elements notes that the Von Roll design is used extensively in Europe, meeting emissions standards tougher than those in the US.

Both Waste-Tech and Environmental Elements will also assist clients in writing and defending permit applications. Permits at the Federal, state, and local levels are usually all necessary.

Mr. Conger of Waste-Tech says that the entire permitting process alone can cost a company between \$600,000 and \$1 million.

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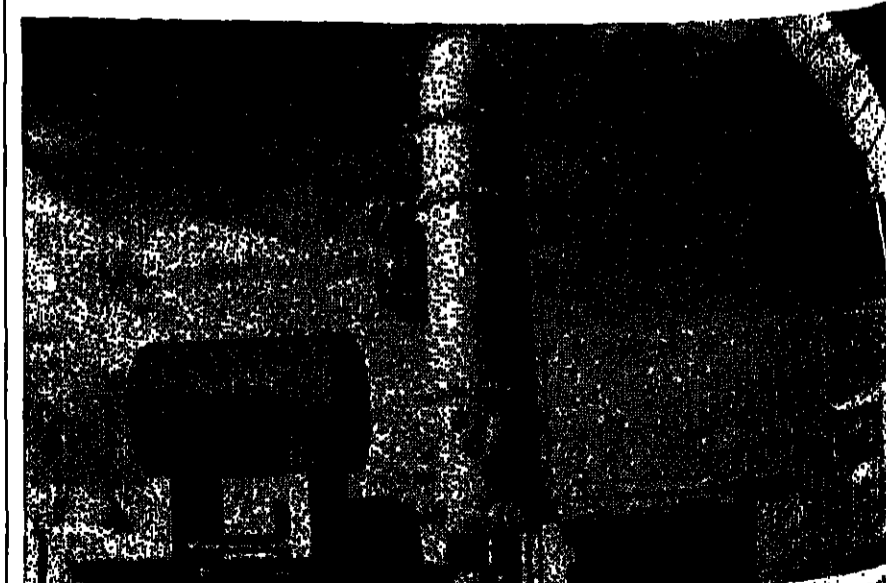
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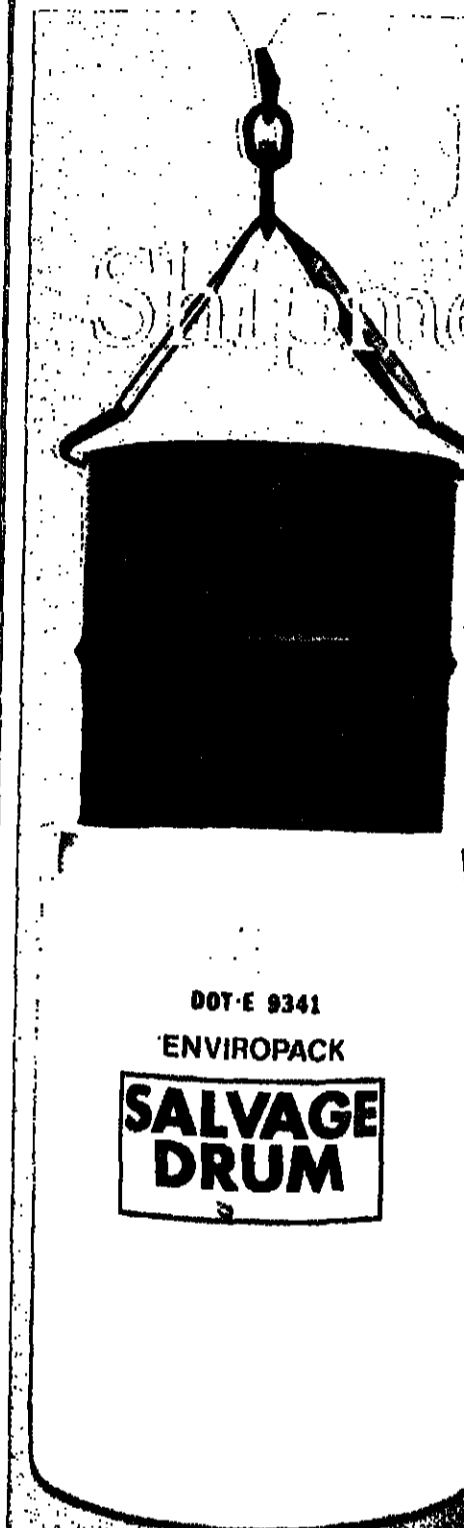
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WASTE MANAGEMENT '86

UNDERGROUND TANKS

Underground Storage: Rules Set for Release

By RONALD BEGLEY

Early next year, Environmental Protection Agency is expected to issue proposed regulations addressing the problem of leaking underground storage tanks. While many of the details have yet to be worked out, EPA has already provided a pretty good idea of what the proposal will look like.

The agency plans to allow single wall construction for new petroleum storage tanks, but they must be made of cathodically protected steel or non-corrosive materials such as fiberglass, and leak detection monitoring for both new and existing tanks will be required.

Underground tanks used to store materials defined as hazardous under the Federal superfund law will be required to have secondary containment systems in place.

"This will include double wall tanks, synthetic liners, or some other barrier to make sure that what leaks out is stopped," says Louise Wise, acting chief of the tank standards branch of EPA's office of underground storage tanks.

Variances may be issued to tank operators who can prove that they have an effective leak detection system in place, compatible with the material being stored.

Although these aspects of the proposal are fairly certain to be included in the version to be issued in February, there is much yet to be decided upon in the EPA proposal. The

agency does not yet know, for example, what its requirements will be regarding specific design and construction of tanks, the manner of installation, and exactly what kind of leak detection system will be deemed acceptable.

Because of these uncertainties, much of the industry is waiting to see what develops rather than trying to anticipate EPA's decisions and start conforming to them ahead of time. However, regulations at the state and local levels have been pushing chemical and petroleum companies to upgrade their underground storage tank facilities and testing procedures.

Mobil Oil Corporation, for instance, has been in the process of replacing its underground storage tanks for several years under a program formalized in 1983, according to Carole Edwards of Mobil's Marketing & Refining Division. Mobil is pulling out its old, mostly steel tanks at its 13,000 service stations, and is replacing them with new fiberglass tanks, at an estimated cost of more than \$100 million, she says.

In choosing which sites to excavate first, Mobil is looking primarily at the age of the tanks and the corrosiveness of the surrounding soil. At some locations, double wall tanks are being installed, depending on such factors as proximity of the tank to the groundwater, porosity of the soil, and local regulations. Most of the tanks being replaced date from the 1950's on, according to Miss Edwards, and are made of non-cathodically protected steel. Placement of the new fiberglass tanks is part of an overall Mobil effort called

the Groundwater Protection Program, which also includes training employees in monitoring and stopping leaks.

Rather than try to conform to the existing and impending regulations on underground storage, some chemical companies are opting to simply remove their underground tanks. "We have a long-range plan of eliminating our underground storage tanks," says Dow Chemical Company's Kurt Frey, manager of environmental regulatory activities for the Resource Conservation & Recovery Act (RCRA). "We will eliminate underground storage of regulated substances where it is safe and practical to do so; our policy is that we will not install an underground storage tank from this point forward."

Dow implemented this program in 1982, prioritizing tanks based on the regulatory status of the compounds they contain. In addition to the environmental concerns of the company, Dow is making the move to avoid the heavy expenses it sees associated with upcoming EPA regulations. "The handwriting is on the wall as far as regulations. Looking at future liabilities, retrofitting of tanks, and conducting ongoing monitoring, the economics are clear," says Mr. Frey, explaining why Dow chose to switch to above-ground systems.

Ashland Chemical Company has also chosen to go to above-ground storage where possible. "We have removed all the underground storage tanks we can," says Ashland's Bob Sterrett, manager of environmental engineering at Ashland Chemical. He cites the lack of absolute assurance of leak detection systems as one reason for his company's action. "The technology to determine failure of an underground storage tank is at best not totally proven," he says.

Added to this is the inconvenience of using unneeded inventory to fill a tank to the top in order to perform a leak test, he says. As far as preventive measures, he cites the high cost of double-wall tanks as another reason for eliminating the use of underground storage tanks.

Another problem noted by Mr. Sterrett is that of leaking piping in underground storage systems. "An underground storage tank provider will say that his tank will last for twenty years, but that's no help if their pipes fail before that," he says. Also, cathodic protection on steel tanks does not solve the problem of leaking pipes.

According to Dr. Austin Snow, E.I. du Pont de Nemours & Co.'s secondary containment coordinator, 50 to 60 percent of leaks associated with underground storage tanks originate in the pipes, a problem not addressed by

use of non-corrosive materials or double-wall tanks. One solution to this problem is the use of liner systems with underground storage tanks.

One such system currently being marketed is Du Pont's "Hytrel" polyester elastomer liner. The liner is placed in the excavation pit during installation of the tank, and is designed to prevent the compound being stored from entering the surrounding soil or groundwater in the event of a leak. "Hytrel," according to Du Pont, is a tough, flexible polymer which was chosen for use in tank liners by virtue of its resistance to petroleum products and a variety of chemicals.

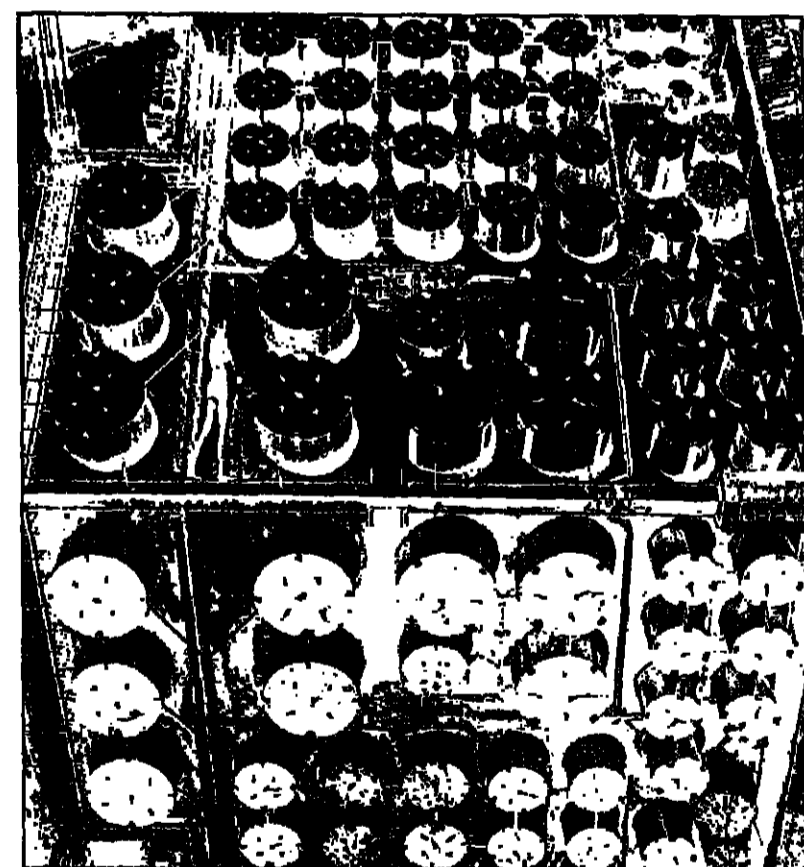
In addition to offering the advantage of protection from leaking pipes, liner systems are also more cost-effective than double wall tank systems, according to Dr. Snow.

While the industry is looking to preventive measures such as non-corroding materials, double-wall tanks, and tank liners, still to be resolved is the issue of leak detection testing. A number of commercial leak detection systems are available, but the industry must wait until next February to find out which system or systems will win EPA approval.

EPA is getting ready to begin a large-scale testing program at its Hazardous Waste Engineering Research Laboratory facility in Edison, N.J. Jack Farlow, chief of the technology development staff at the laboratory, notes that there is a lack of hard data supporting claims made by leak detection system vendors for their products. Consequently, his staff has set up an underground storage system for the purpose of testing the leak detection equipment available on the market.

Testing the leak detection equipment involves being able to manipulate more than 10 variables in the tanks, says Mr. Farlow, including changes in temperature, pressure and size of vapor pockets, tank deformation, and the size of the leak. For the detection system being tested, it is first determined what it measures and how its measurements are used to determine whether or not a tank is leaking. Then, by running its own tests, the EPA laboratory staff determines the validity of the procedure in question, as well as its accuracy.

The final step, according to Mr. Farlow, is for the vendor to come in and use his leak detection system on the EPA underground tank set-up, while the variables are manipulated by EPA personnel. At the end of the process, EPA and the industry will find out what guidelines governing leak detection system are to become the new industry standards for underground storage tanks.



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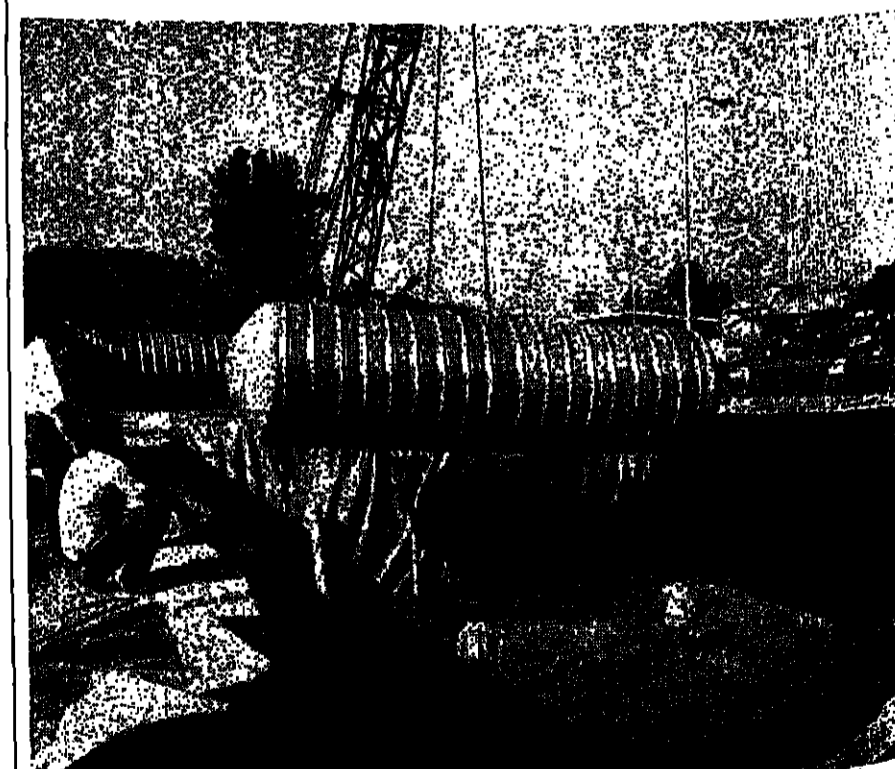
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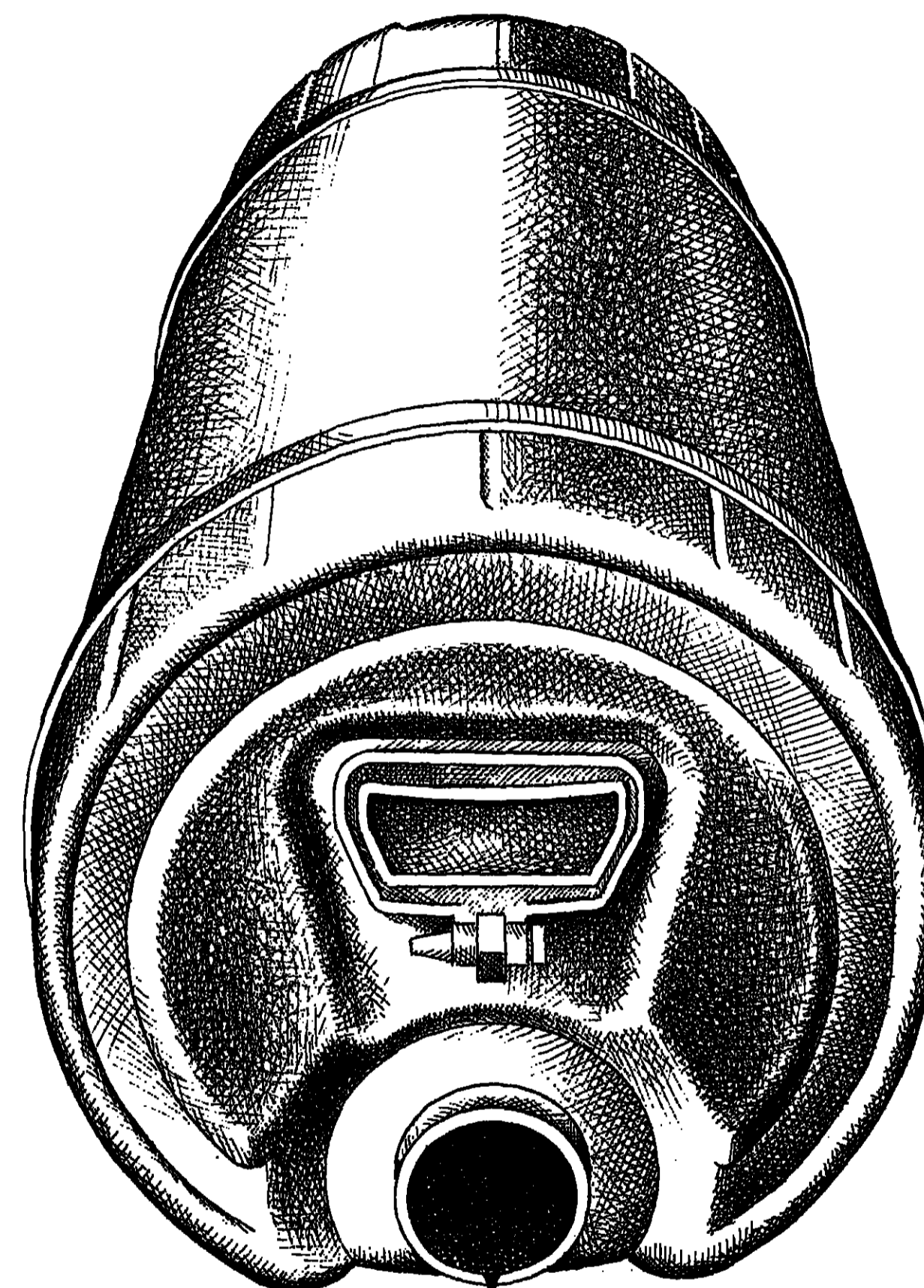
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John C. 1516

WASTE MANAGEMENT '86 OVERVIEW

Waste Cleanup Fuels High-Growth Industry

By JAMES GUBITOSI

The rest of the 1980's and the 1990's will continue to be cleanup time for the US chemical industry and all industries generating hazardous wastes. While there has been a virtual moratorium on the construction of major new producing plants by chemical makers, waste treatment companies that were hardly known in the 1970's have become the fastest growing employers of the nation's chemical engineering talents.

The commercial market for newly generated hazardous waste in the US is estimated at \$1.6 billion for off-site treatment. In addition, commercial firms have a piece of the \$11 billion spent on site for waste treatment in engineering services and mobile on-site treatment facilities.

Also, the cleanup of abandoned chemical dumps and the upgrading of operations at active disposal sites has provided a growing opportunity for engineering companies such as Kellogg & Co., of Denver, Colo.

Much of the chemical industry's continuing high level of capital expenditure has been devoted to improved pollution control (the other big tab has been for energy conservation), but because of the reauthorization of the Resource Conservation & Recovery Act in 1984 and the stringent requirements of the superfund bill signed into law by President Reagan last month, the pace of growth in commercial hazardous waste management is not expected to slacken from the 25 percent-per-year rate experienced so far in the decade.

Waste Control Efforts Found To Be Lacking

By GLENN HESS

Less than 1 percent of the annual \$70 billion national anti-pollution effort is aimed at curbing production of toxic wastes and current programs "do little more than move waste around," says a congressional report.

The Office of Technology Assessment says more than 99 percent of both Federal and state budgets for pollution control are spent to fight pollution after waste has already been generated — not to devise programs to limit the amount of toxic waste actually produced.

Existing pollution control and waste treatment methods often "do little more than move waste around, and many hazardous wastes, such as toxic air emissions, are not yet regulated," OTA says.

"Reducing the generation of waste is the most certain way to reduce risks to health and the environment from hazardous waste," says the report.

"Most hazardous waste experts have agreed for a decade that waste reduction should receive top priority... but few resources have been committed to doing so," the report adds. "If waste reduction is the best answer, it deserves top priority, and the government and industry should get serious and make it work."

Rep. John Dingell (D-Mich.), who requested the study, says its findings show that by reducing waste production, US firms could improve productivity and "help restore the competitiveness of American industry in very difficult global economic environments."

ities, a move that will increase its capabilities for services to the public sector, said Dean L. Buntrock, chairman and chief executive officer.

Chemical Waste Management, which claims to be the largest provider of comprehensive hazardous waste management services in the US, said that the approximately \$310 million of proceeds from the sale of 19 percent of its equity to the public, will be used to pay a cash dividend to Waste Management and repay certain indebtedness owed to that company.

Areas of rapid growth for CWM include resource recovery, thermal destruction, chemical treatment and consultation and remedial service for companies that do their own hazardous waste treatment.

Of these, the fastest growing for the industry as a whole is likely to be high-temperature incineration. Chemical Waste Management claims to have the highest capacity in the US for high-temperature incineration and it is planning to add new capacity for future growth.

For the past twelve years, the company has been operating two ocean incineration ships—Vulcanus I and Vulcanus II. These have been used for the destruction of polychlorinated biphenyls and biomedical waste, as sludges and liquids.

A new name, in a small way, in the field of hazardous waste treatment is Degussa Corporation, the German-based producer of metals and catalysts and one of the world's three largest producers of hydrogen peroxide.

Degussa has developed and is offering commercially hydrogen peroxide technology for the treatment of cyanide-containing waters from mining operations, plating shops and various chemical processes.

As compared with existing processes for cleaning up cyanide, the Degussa method is said to avoid the formation of cyanogen chloride and chlorinated hydrocarbons, which are themselves pollutants. Any hydrogen

peroxide in the process will break down into oxygen and water, a spokesman for Degussa said.

Another small but fast-growing cleanup manager is Rollins Environmental Services Inc., of Wilmington, Del., whose revenues have risen from just \$36 million in fiscal 1981 to \$105 million last year and topped \$135 million this year.

Rollins claims to be the technological leader in the chemical waste treatment and disposal industry, despite its comparatively small sales volume. It operates facilities at Baton Rouge and Plaquemine, La.; Bridgeport, N.J.; and Deer Park, Tex.

Rollins' earnings in the last fiscal year, ended September 30, were \$18,597,000 up from \$11,856,000 in 1985. In the fourth quarter, the company had earnings of \$3,844,000 up from \$3,218,000, as revenues climbed to \$39,846,000 from \$28,318,000.

Challenging Chemical Waste Management for leadership in hazardous waste treatment technology has been GSX Corporation, of Columbia, South Carolina. The company claims to have the most technologically advanced incinerator operating at Rockwell, S.C., with a destruction efficiency of 99.99 percent. GSX's revenues and income have grown eleven times from the level of only six years ago, a company spokesman stated.

One of the companies rapidly expanding its role as an outside source for consulting and treating on-site wastes is John Zink Services Incorporated, of Tulsa, Okla., a subsidiary of Allegheny International Corporation.

Zink claims to have more such on-site facilities operating than any other company in the world. All the facilities are managed by Zink's own professionals and require no additional staffing by the client companies.

According to government figures, some 51 percent of all hazardous wastes are treated, 51 percent are stored, 20 percent are disposed and 4 percent are recycled. The figure

Continued on Page 42

WASTE MANAGEMENT '86 RESOURCE RECOVERY

Resource Recovery Grows in Popularity

By PHILIP MANN

For legal and economic reasons, chemical companies of all sizes are striving to increase their resource recovery capabilities, while other companies specializing in resource recovery are opening around the country.

Resource recovery used to be regarded unfavorably because raw materials were generally less expensive than recycled materials. In addition, land disposal was relatively cheap. However, raw material costs have increased, and reauthorization of the Resource Conservation & Recovery Act of 1976 will virtually eliminate land disposal of wastes, leading generators to find other methods of elimination.

Therefore, resource recovery is now a highly regarded way of eliminating wastes and saving money, while complying with Federal regulations.

Allied-Signal has many resource recovery programs that help recoup operating expenses, say company spokesmen. A new program, under the auspices of Allied's Aquatic Systems Division, involves a technology called electrolytic water splitting.

Through this technology, salt is extracted from waste streams and regenerated into its acid and base forms. Brian Rogers, a technical sales engineer at Allied, says several companies have used for salt's acid and base forms in their chemical processes.

Allied contracted its first sale of this technology in late September. Mr. Rogers estimates the technology should allow the purchaser to save about \$400,000 on average the first year. He says this savings will result from fewer hydrofluoric acid and nitric acid purchases and decreased waste disposal costs.

Allied also recovers calcium fluoride from its metallic fluorides facility in Metropolis, Ill. The company once predicted that savings from recovered calcium fluoride would allow the \$3-million recovery facility, built in 1982, to pay for itself by this year. Roger Christen, director of the manufacture of calcium fluoride, says that goal has not been reached, but adds that "the economics have been close to original projection."

Another program consists of recovering marketable sulfuric acid from an electric company's magnesium sulfate medium. The electric company uses magnesium sulfate to remove sulfur dioxide from its flue gas scrubber. After the spent scrubbing medium is sent to Allied, which regenerates the magnesium sulfate and retains the recovered sulfuric acid.

furic acid. The magnesium oxide is sent back to the electric company.

Chemical Waste Management is primarily involved in two types of resource recovery. Its solvent recovery system consists of taking a customer's spent solvents and running them through a distillation process, separating reusable material from non-reusable material. The reusable material is either returned to the customer as a clean solvent, or sold to other companies. The non-reusable material is disposed of.

Bob Reincke, manager of public affairs at CWM, estimates that between 70 and 75 percent of a typical spent solvent stream will yield reusable material. He continues that the recovered material is resold at about 80 to 90 percent of the cost of the original raw material.

The company's second main program is the "Alternative Fuels Program." Waste streams that cannot be distilled into clean solvents are converted into fuel by a proprietary process, blended with other compatible wastes, and filtered. What remains is a fuel that can be burned in industrial furnaces. Mr. Reincke notes that this system is only contracted to those who use industrial furnaces, like cement kilns and asphalt plants.

At one of CWM's facilities is what the company calls a fractionation column, used to separate multi-component solvents. For example, if a company has contaminated a solvent by accidentally placing it in the wrong tank, the fractionation column can separate the materials into their original forms.

EXPANSION PLANS

Mr. Reincke says CWM hopes to expand its capacities for all its programs. In 1983, the company had one facility, but it now has five.

Eco-Tec says that its acid purification unit (APU) is able to reclaim pickle liquor for continuous use, as opposed to the waste treatment or disposal of spent solutions.

Eco-Tec started the APU in March 1985 at Continuous Colour Coat Limited, a continuous strip electroplating and coil coating facility near Toronto. The company uses sulfuric acid to pickle cold-rolled steel prior to electroplating. The APU is designed to remove organic contaminants and control the amount of dissolved iron in the pickle solution continuously, so the acid can be used indefinitely.

Previously, iron build-up in the process bath rendered the acid ineffective. The bath had to be continuously decanted to waste and replaced with fresh acid solution. Eco-Tec says the APU equipment operates with minimal attention and only occasional maintenance, and does not interfere with the master process.

The steel pickling line operates three shifts a day, five days a week. Prior to APU installation, the pickling bath was continuously discarded at a rate of 0.75 gallons per minute. Continuous Colour Coat Limited pegged its annual sulfuric acid loss at 280 tons, or about \$26,000 (Canadian) a year. Another process cost was 225 tons a year of neutralization lime used in waste treatment. This added about \$18,000 to the annual cost. Now, with APU fully operational, the savings in acid and lime are more than \$40,000 a year. Total cost of implementing APU was less than \$100,000.

Eco-Tec's most recent program, according to general sales manager Michael Dejak, is helping the printed circuit board industry. Copper is used to lay down circuits on plastic boards. Some of the copper ends up in the waste stream. Eco-Tec recovers the copper, which is in liquid form, turns it into copper metallic sheets, and resells it. Because the copper was formerly disposed of in landfills, Mr. Dejak calls the program "a great incentive for responsible companies."

A third Eco-Tec program involves acid

minum anodizing. Aluminum surfaces on buildings are finished, to prevent corrosion. Eco-Tec recovers caustic soda, sulfuric acid and phosphoric acid used in the finishing process. Mr. Dejak says that caustic soda consumption can be reduced by 70 percent, sulfuric acid consumption by 50 percent, and phosphoric acid consumption by 85 percent.

Kipin Industries is building a hazardous waste-to-fuel plant near Pittsburgh. The plant was originally scheduled to be open last Summer, capable of handling 100 tons of sludge and waste a day. Peter Kipin, president of the firm, says the company decided to redesign the plant, increasing its capability to 800 tons a day. Because of the change, the plant won't be opened until August or September 1987.

The plant will be a joint effort among Kipin, state and local governments, two electric companies, and two universities. The government will provide financial assistance, the universities will be involved in research, and the electric companies will use the fuel.

Kipin also hopes to expand its portable units. For a fee of about \$50 per cubic yard of hazardous waste, Kipin takes oily wastes and mixes them with filler, such as sawdust or wood chips. A Kipin-developed additive binds the oil and filler, and afterward the product is briquetted, or turned into pellets, by low heating. Mr. Kipin says the fuel generally has a heating value of 11,000 or 12,000 Btu's per pound.

On October 30, Evergreen Oil, Inc. opened a \$10-million facility which recycles discarded lubricating oil and turns it into usable petroleum products. Evergreen claims this is done without waste or pollution. Using the science of "Petroecology," the plant is in Newark, Calif.

A fleet of tanker trucks collects used oil

from service stations, auto dealerships and railroad yards and brings it to Newark. Previously, says Ted James, director of corporate communications, such oil was discarded or burned. With Evergreen's system, the used oil can be re-refined and turned into usable lubricating oil again. The waste material removed from it is used to make roofing material.


Mr. James gives the following breakdown: when the oil comes to Newark, about 10 percent is water. Of the rest, 80 percent becomes usable lubricating oil. About 6 percent is used to power the plant, about 5 percent is turned into the equivalent of number two diesel fuel, and the remainder becomes asphalt flux.

Petroecology was developed by Evergreen's parent company, Kinetics Technology International, and was first used in Greece. Mr. James says that facilities similar to the one in Newark, but twice the size, are planned for Chicago, Dallas, Denver, Kansas City, New York and Philadelphia. The next facility, to be built in Los Angeles, is scheduled for next Spring.

CF Systems Corporation's "Organics Extraction System" is designed to recover organics from liquid or solid wastes. According to CF spokesman Thomas Cody, the waste is fed into the top of the extractor, while a solvent moves into the bottom of the extractor. The two make contact, and about 99 percent of the organics are dissolved. Clean water, or a water-solids mixture, is removed from the separator.

At this point, the solvent gas-organics mixture leaves the extractor and passes to the separator. Most of the solvent vaporizes in the separator, releasing concentrated organics. A heating process then vaporizes the remaining solvents. Organics are drawn off from the separator and recovered for re-use or disposal, usually by incineration.

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November 17, 1986

CHEMICAL MARKETING REPORTER

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WASTE MANAGEMENT '86 PCB'S

PCB Disposal Methods Await EPA's Approval

By NICHOLAS BOYLE

Problems associated with the disposal of polychlorinated biphenyls have led to increasingly diverse and specialized solutions.

Transformer owners, for example, wishing to get the most out of their units but needing to comply with a Federal order to remove the PCB's by 1989, have been seeking methods of PCB destruction that would allow them to keep a transformer in service for the rest of its intended life.

One such method is Unison Transformer Services Inc.'s "Reclass 50" transformer retrofit technique. It involves a time-consuming but effective process whereby PCB's are leached out of the transformer capacitors by a dielectric fluid called TF-1, separated out of the TF-1, and then shipped to one of three incineration sites approved by Environmental Protection Agency for disposal.

Unison, a wholly-owned subsidiary of Union Carbide Corporation, is waiting for final EPA approval before it begins full-scale operations at its Henderson, Ky., plant. Wayne Jenkins, plant manager in Henderson, says the long and frustrating hearing and approval process is coming to an end: "Only the final permit remains. We anticipate starting commercial operations in late November."

An advantage for the transformer owner is the on-site method employed in the "Reclass 50" process. Technicians arrive, drain the PCB's into drums, install the TF-1, and depart with the PCB's. The transformer may then be re-energized and operated with the dielectric fluid inside for five months, after which, the process is repeated. Contaminated TF-1, now called TF-X, is taken to the Hen-

derson plant and the transformer is filled with another batch of TF-1. After another five-month period, "the unit is drained again, re-gasketed, silicon is installed to sponge out the remaining PCB's, and, once a 90-day test period is completed, it is reclassified for commercial use," says Mr. Jenkins.

Federal law stipulates a unit must be 98.67 percent free from PCB's, says Mr. Jenkins, "but our results before EPA were over 99 percent free of PCB's, or less than 2 parts per million."

The contaminated TF-X is put through a proprietary separation process at the Henderson plant that recycles 95 to 98 percent of the TF-1 and isolates the PCB's for shipment. "There are no byproducts from this process; we use no process water and no discharge results," says Mr. Jenkins.

A slight amount of PCB's may escape into the tank vent, explains Mr. Jenkins, but it is trapped by a carbon filter bed which is incinerated along with the PCB's.

This transformer reclassification process benefits the owner by allowing continued operation but eventually the transformer's capacitors are going to expire. For those askarel transformers still containing PCB's at this expiration point, Chemical Waste Management Inc. and Electro-Pyrolysis Inc. of Wayne, Pa., are developing a plasma arc furnace — a "thermal treatment unit that would offer complete destruction of the capacitors and PCB's at the same time," says CMW.

One of the primary benefits of this design is a one-step sealed loading system which reduces human exposure to PCB's to a minimum. The other is that the capacitor's molten metallic residue is cooled into an ingot, from which the metals can be reclaimed.

CMW and Electro-Pyrolysis are also awaiting the issuance of an EPA permit to begin testing the furnace at Model City, N.Y. site.

Proposed at-sea incineration plans were scrapped last Summer and landfilling liquid PCB's has become increasingly expensive because of the controversy surrounding the incidence of migration into nearby water resources and will not be permitted, unless under special circumstances after June, 1987. Faced with the rising costs of incineration and the growing backlog of PCB-laden materials, the chemical industry is focusing on the detoxification of PCB's.

Chemical Waste Management has been operating its "CMW-DeChlor" technique since last Summer. This treatment process, less expensive than incineration, strips the PCB molecules of their chlorine atoms and allows mineral oils to be recovered.

Degussa Corporation, seeking ways to treat the enormous PCB problem in Germany and at the same time reclaim the oils that contain them, is at work on a distillation process that disperses metallic sodium throughout the contaminated oil (CMR 4/14/86, pg.18). "The sodium metal reacts with the chlorine in the PCB's and you get sodium chloride," says Michael Verbeke, vice-president of chemicals at Degussa. The pilot plant is currently under construction and will interact closely with companies manufacturing mineral oils and the equipment to handle them. Mr. Verbeke adds that commercial treatment should begin, once the correct patent is acquired, in the Fall of 1987.

Another approach to PCB disposal has been developed and successfully tested by Modar Inc. of Houston, Tex., and Cecos International Inc. of Buffalo, N.Y., at Modar's research facilities in Natick, Mass., and Cecos' Niagara Falls site. It is an oxidation process whereby contaminated materials are pressurized and introduced with compressed oxygen into the system. The solution is then heated to above 374 degrees and a pressure of 3200 pounds per square inch is maintained. Constituents of the waste solution are either oxidized or converted to carbon dioxide, water or weak acids.

Claimed advantages of the Modar/Cecos system include the recovery of energy from waste streams and reapplication of that energy in the preheating treatment of waste. An enclosed system which provides complete control of the process, and the elimination of stacks and scrubbers necessary for removal of pollutants by incineration combustion.

The Modar technology is targeted for use in operations as waste generators, commercial waste treaters and disposers, and decontamination of superfund sites. Modar and Cecos expect full-scale plant operations to begin December 1987. Although this new technology is not an incineration process, it needs EPA combustion efficiency guidelines for incineration of PCB's by fifty times, according to a Modar spokesman.

Though all of these techniques of detoxification, chemical treatment and the methods of PCB disposal are promising in long demonstration, testing, public hearing and approval process that goes hand-in-hand with PCB's slows development down. Contributors to the mounting quantities in backlog at the three EPA-approved incineration sites.

Tests such as the General Electric EPA witnessed demonstrations of detoxification of PCB's in South Glenn Falls, N.Y., were recently postponed.

The search for alternative heat transfer media to PCB solutions has led industry researchers to various silicones. "The silicones are ideal for transformers," says Wayne Jenkins of Unison. "They are immiscible, ultra-stable dielectric fluids. They don't require annual servicing such as checking for leaks in an askarel transformer, and they are far less flammable."

The fire-point of the Union Carbide silicones used in the final step of Unison's TF-1 removal process is greater than 300 degrees centigrade. Though a mineral oil or askarel transformer costs less initially, the silicon transformer is said to require less maintenance and has lower installation and long term operating costs.

technical assistance to help companies achieve waste reductions.

"EPA found that industry has a significant potential to reduce public health and environmental risks by minimizing its hazardous waste production," says Mr. Porter. "As a result, EPA will encourage industry to use ways to reduce both the volume and toxicity of its waste."

Of the 286 metric tons of hazardous waste generated annually in the US, EPA says the chemical industry produces 100 million tons, or 68 percent.

Waste Cleanup

Continued from Page 40

add up to more than 100 percent better storage and treatment usually figure in disposal and recycling.

Of the 20 percent of the hazardous waste that are disposed, some 7 percent go into landfills, 45 into impoundments and other land storage systems and the remaining 48 percent into injection wells. Of the waste that have been treated, present practice is that 85 percent goes into some kind of storage and the rest is treated by biodegradation, chemical neutralization and other chemical processes.

Since in present practice, the great bulk of the hazardous substances discharged by industry eventually goes into some kind of land storage or other storage system, "the industry's greatest challenge will be to come up with technological advances in incineration, recycling and process modification to prevent the generation of hazardous substances."

Waste Control

Continued from Page 40

reducing industrial wastes by 10 percent annually for the next five years.

Mr. Hirschhorn says such a goal could help convert the long stated importance of waste reduction into a true priority and reduce annual environmental spending substantially.

By reducing waste, concludes OTA, industry would use materials more efficiently and lower waste management, regulatory compliance and future cleanup costs, as well as reduce uncertainty but potentially large civil and criminal liabilities and promote modernization and innovation.

In a recent report to Congress, EPA says a survey of 22 industrial processes indicates that industry has the potential to reduce the amount of hazardous waste it currently produces by one-third or more.

The agency plans to develop the first national computerized data base on waste reduction techniques and says it will provide

HEAVY & AG CHEMICALS

Sodium Tripoly Gets

Continued from Page 3

grew to 30 percent this year, from 27 percent last year. Another dark cloud is the possibility of more anti-phosphate legislation. Currently, says Monsanto's Higgins, discussions about prohibiting phosphate-containing laundry detergents are going on in Virginia and North Carolina.

The feeling among many in the phosphate industry, though, is that these bans have less than favorable chances of enactment, and that, overall, anti-phosphate sentiments are on the wane. Today, about 25 percent of the US market is closed to phosphate detergents. Imports continue to annoy tripoly producers. Through September they are up more than 25 percent over last year's levels. At 5 or 6 percent of the market, imports are not a significant volume threat to US producers, but they do have an effect on pricing.

Today's sodium tripolyphosphate list price of 57¢ cents per pound in bulk, f.o.b., represents a decrease of 2 cents per pound since the beginning of the year. Producers attributed the reduction to import pressure and improved operating costs.

The softening of the dollar has decreased the competitiveness of much of the imports from Europe, but material from major exporters such as Israel, Italy, China and Mexico is relatively unaffected. Overall, producers feel imports will not penetrate much further.

Sources say that for the majority of customers, tripoly is sold at list. For some of the large detergent companies, however, a small amount of discounting is said to exist.

CHLORALKALI — Dow Chemical USA is initiating a \$10-per-ton increase in the off-list price of chlorine and a \$25-per-ton increase in the off-list price of caustic soda solution. The increases are effective immediately for spot business and as terms allow for contract business.

New chlorine prices will not exceed \$195 per ton, Lab. Freeport, Tex., Plaquemine, La. and Pittsburg, Calif.; and \$200 per ton, f.o.b. Northern shipping points.

For caustic soda solution, prices range from \$175 per ton (in Freeport and Plaquemine) to \$200 per ton (in Arvada, Colo.). All prices are dollars per ton (basis 76 percent NaOH for 50 percent regular grade).

Prices for 50 percent purified grade are \$20 per ton higher than regular grade prices at applicable shipping points. Prices for 73 percent regular grade are \$30 per ton higher than 50 percent regular grade. Prices for 73 percent purified grade are \$45 per ton higher than 50 percent regular grade.

Dow notes that, with moderate demand growth, chlorine operating rates are above 90 percent of on-line capacity. Additionally, Dow says that caustic soda demand has increased, resulting in what the company calls an improved "balance" of these co-products.

Dow also announces that, effective January 1, a superfund tax will be added to chlorine at \$2.70 per ton, and caustic soda (all grades) at 28¢ per ton, as a separate line item to each invoice.

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	AUG.	JULY	AUG. '85
Chlorine			
Cap Produced	27,437	29,287	27,347
Liquid Produced	23,272	24,400	23,244
Liquid Shipped	13,559	14,945	14,428
CAUSTIC SODA			
Solid Produced	28,221	29,254	28,583
Solid Shipped	555	801	717
CAPACITY	35,000	36,385	36,028
OPERATING RATE	90.0%	88.8%	78.3%

Sources: Chlorine Institute, Occidental Chemical Corp., Occidental Chemical Corp. Includes amount later converted to dry basis.

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Waste Reduction

Continued from Page 32

adds, and do not take increased productivity into account.

The company was cited by OTA as one of the national leaders in waste reduction. Earlier this year, 3M's Decatur, Ala., plant was awarded a state citation for progress in waste reduction. Company spokesmen report that company plants in Tennessee, Minnesota and Wisconsin have received similar praise. An integrated problem solving approach has been the key. Dr. Susag explains, "We have tried to take environmental protection and pollution management issues out of the exclusive domain of the corporate staff, involving manufacturing, design and operations people in the process."

Among the innovations used to encourage cooperation are "idea sheets," posing problems brought up by individual plant managers and executives. When solutions are found, design and plant teams responsible are cited and the amount of money and waste saved are reported.

Dr. Susag says that waste reduction at source has definitely paid off, illustrating this with an example of changes implemented at 3M's "Chemolite" plant in Minnesota. The facility, which produces magnetic oxides, was discharging too much ammonium sulfate, a reaction byproduct, into its wastewater. When concentrated ammonia levels exceeded state quotas, the company had a choice: either build a waste processing facility for \$1 million, which would entail producing a solid sludge, and eventual land disposal headaches, or find a way of recovering ammonia in the process bed.

The plant team which solved this problem decided to use a vapor compression evaporator, costing \$1.5 million, to recover ammonia from the waste stream. The 40 percent NH₃

solution recovered is now being sold as fertilizer, generating \$150,000 in revenues per year, and preventing the discharge of 677 tons of water pollutants.

Similar innovations, from new reactor cleaning systems to water-based pill coatings, have resulted in similar savings and substantial waste reduction.

Like 3M, Dow has had a corporate "multi-media" waste reduction program in operation for over a decade. From 1970 to 1984, the company saw a 90 percent reduction in air emissions alone.

Ryan Delcambre, issue manager for waste management at the firm, reports that Dow processes all of its wastes internally, mostly through its Texas Division. None of its hazardous waste is handled off-site; less than 1 percent of the total amount of waste generated, in the form of incinerator ash, is land-filled.

The company is focusing on reclamation, incineration and biodegradation. Recycling has also become a more prominent form of waste reduction at Dow's Louisiana Division plastic plant. Mr. Delcambre reports that about 500 pounds of HDPE are being recycled there daily. Non-process specific biodegradation is the main form of treatment at the company's Louisiana, Texas and Michigan plants.

Mr. Delcambre reports that the program has enabled Dow to realize substantial savings.

Other chemical companies have also discovered the benefits of waste reduction. OTA cites Rohm & Haas and Exxon Chemical Americas as reducing waste by 10 percent each from 1984 to 1985. Two divisions of Du Pont were said to have reduced waste by 50 percent and 35 percent, respectively.

Although most major chemical companies

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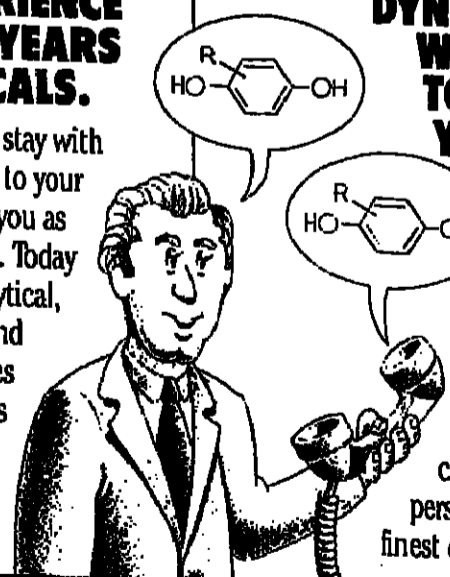
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Alzheimer Drug To Be Retested

The medical and scientific advisory board of the Alzheimer's disease and related disorders association (ADDA) announced today that it will be organizing further testing of the oral drug, tetrahydroamorrindine (THA), in the treatment of Alzheimer's disease patients.

This is in response to a report published in the Nov. 13 issue of the *New England Journal of Medicine*.

The report describes the findings of the University of California at Los Angeles. Dr. William Summers and his associates administered THA to 17 patients, average age of 70, with presumed moderate to severe Alzheimer's disease. Each patient was given THA orally in doses determined individually for each patient and nine or more capsules of commercial lecithin per day in this double-blind study. Overall, 10 of the 17 patients showed significant improvement in performance on some tests and ratings. No serious

side effects attributable to THA was observed.

According to the medical and scientific advisory board of ADDA these results are interesting and provide a basis for further research. This research needs to be replicated by other laboratories and with many more patients before definitive answers can be given about THA's value in treating Alzheimer's patients.

Alzheimer's patients have decreased amounts of the brain chemical, acetylcholine. THA inhibits the enzyme, acetylcholinesterase, which breaks down acetylcholine. By inhibiting this enzyme, THA increases the amount of acetylcholine in the brain. THA has also been reported active as a potassium channel blocker. Lecithin provides the essential substance, choline, used to create acetylcholine.

Over the past few years other cholinergic drugs have been tested in Alzheimer's disease with relatively little or no therapeutic benefit. These tests have raised and crushed the hopes of Alzheimer's disease patients, their families and caregivers. In order to speed the process of assessing the value of THA in Alzheimer's disease, ADDA's medical and scientific advisory board is organizing a team of scientists to replicate these findings in double-blind studies of THA. These studies will attempt, with a larger group of Alzheimer's disease patients, to replicate the results reported by Dr. Summers and his associates.

ADRA is a national not-for-profit voluntary health organization dedicated to finding a cure for Alzheimer's disease by developing and funding research programs. By the end of 1988 ADRA will have spent an estimated \$4.5 million on 122 separate research projects.

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Standard Oil

Continued from Page 3

improved technology to meet a growing demand. "Davy's derivative technology enables us to shift feedstocks from high-cost acetylene to lower cost butane," he adds.

Peter Walte, chief executive of Davy McKee Petroleum & Chemicals, says the ability of the combined technologies to produce lower cost engineering plastics and elastomers will have a substantial impact on the advanced materials marketplace.

"The availability of Davy's butanediol to PBT technology, commercialized by our Frankfurt-based subsidiary, Zimmer, and the opportunity to develop PBT to selected fibers, enhances the market potential available to our companies," he says.

Some 51 percent of this year's 350-million-pound maleic anhydride demand is expected to come from unsaturated polyesters, with 11 percent going to tube oil additives, 8 percent to agricultural chemicals and 10 percent into production of fumaric acid.

Butanediol's fastest-growing outlet is to polybutylene terephthalate, a high growth thermoplastic, while gamma-butyrolactone is a precursor for producing the pyrrolidones family of chemicals, including N-methyl pyrrolidone, a solvent under consideration as a replacement for methylene chloride in paint stripper formulations. Tetrahydrofuran finds use in solvent applications and in poly-THF for specialty elastomers.

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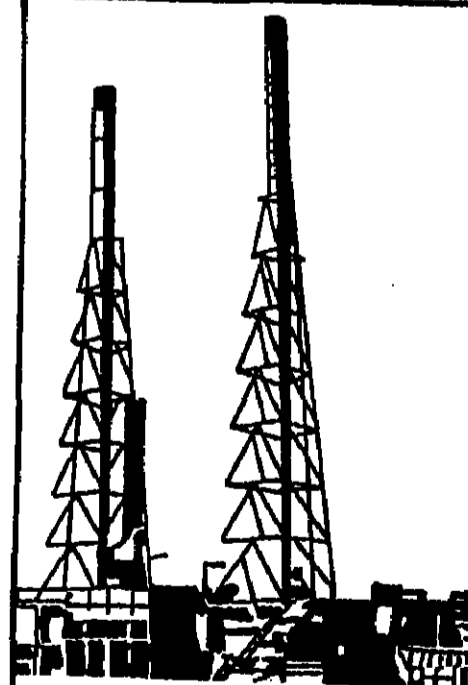


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EPA Draws Praise

Continued from Page 7

to the Resource Conservation & Recovery Act to end land disposal of untreated toxic wastes in the next five years. The agency estimates it will cost industry \$152 million a year to meet the restrictions on dioxins and spent solvents.

In response to the ban, the Halogenated Solvents Industry Alliance (HSIA) is urging its members to immediately arrange for incineration of their waste material.

At the same time, HSIA is strongly calling on EPA to work with state and local governments to expedite the siting and permitting processes for incinerators in order to provide for the fastest possible increase in capacity.

HSIA president Dr. Paul A. Cammer said, "EPA must recognize the reality of this situation. The new prohibitions on disposal of solvent wastes at hazardous waste disposal facilities mean industry will have to rely almost exclusively on incineration."

"Right now," Mr. Cammer stated, "there is inadequate incineration capacity for certain categories of waste to meet current, let alone future, demands. While it is true that many general incinerators exist nationwide, the capacity for incineration of solids and sludges is grossly inadequate."

"This means," Mr. Cammer stressed, "EPA must act immediately to increase the capacity of existing incinerators and permit the construction of new facilities."

SOLVENTS ARE RECYCLED

Mr. Cammer points out that a major portion of chlorinated solvents used in this country are recycled, thereby fulfilling the resource recovery intent of RCRA. This also reduces the volume of solvent waste requiring disposal. The waste sludge that remains following the recycling process is the object of this rulemaking.

Mr. Cammer called on HSIA members to contact their Federal and state legislators and regulators to urge them to work for the rapid approval of new incinerators in their districts, as well as increased capacity for those already in operation.

Mr. Cammer also says that companies without access to incineration services should contract for them as quickly as possible.

He notes, that there are some exemptions to the new regulations. It may be possible for some companies to get a one-year extension of land disposal rights, with a possible renewal for an additional year. EPA will consider these requests on a case-by-case basis.

Other exemptions to the land disposal ban are a two-year delay for wastes with a total solvent content of less than 1 percent and a two-year delay for "small quantity generators," who produce 100 to 1,000 kilograms of waste per month.

Mr. Cammer says HSIA is preparing an

information package for its members which includes details of the procedural requirements and instructions for filing an individual company's petition for an extension, addresses and telephone numbers of Federal and state hazardous waste officials, and lists of commercial incinerators and solvent recyclers.

"HSIA endorses incineration as the most complete and environmentally acceptable method of waste sludge disposal. However, we are greatly concerned with the agency's assessment of both incinerator capacity and the demand for solvent sludge wastes," Mr. Cammer adds.

He says HSIA will continue to work with EPA to further quantify and update both incinerator demand and capacity for solid and sludge wastes.

Scientists in Flap

Continued from Page 7

agency involved, the Pan American Health Organization.

It was also disclosed last week that researchers at Oregon State University had conducted field trials on a gene-altered vaccine in New Zealand without permission from the US government. The tests were financed by the Department of Agriculture and approved by two agencies of the New Zealand government.

A spokesman for the Industrial Biotechnology Association said the revelations reflect a belief by many scientists that US technology regulations are a barrier rather than a safeguard for the emerging industry.

"The pathway may be clearer in foreign nations to getting approval," said Dr. As Goldhammer, director of technical affairs for IBA.

Environmentalists responded by filing a lawsuit which asks the US District Court in Washington to invalidate the White House biotechnology guidelines.

The Foundation on Economic Trends and Environmental Protection Agency and the Agriculture Department ignored the advice of their own scientists to permit certain organisms to be released into the environment without review.

The suit contends documents show that 23 of the 23 scientists who reviewed the regulations warned against the exemptions.

"They clearly show an overwhelming number of scientists at EPA and USDA were opposed to the biotechnology guidelines," the President and said they were scientifically indefensible," says Jeremy Rifkin, foundation president.

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Engineering Resins Marketers Shifting to a 'Niche' Strategy

The engineering resins industry is going through fundamental changes as it struggles with lower growth, declining value added, and reduced potential for profitability.

Yet even though the business is changing, it is thriving. The key to product development for the next five years is more complex metal replacement and the development of specialty product systems. The results of those changes will not bear fruit for almost a decade, but growth will hold at 3 to 6 percent per year until then.

So says Business Communication Company, Stamford, Conn.-based research firm in a new study which adds that producing companies such as E.I. du Pont de Nemours & Co. and General Electric Company have been shifting focus toward "product modification" in recent years, anticipating the maturing of the market.

Emphasis is primarily on alloying, but fiber and filler compounding/reinforcement are also being stressed, as are the utilization of liquid crystal and interpenetrating network technology.

are the "good old days" of 15 percent annual growth, the company says, given its reading of the swing electronics and automotive markets.

Other segments — consumer, industrial, construction, for example — face declining growth rates as the sectors mature. In short, the market is becoming heavily dependent on the economy, which, economists predict, will grow at 2 to 4 percent over the next several years.

While a lower growth rate for the industry as a whole is forecast, BCC sees the specialty part of the business as the silver lining to the cloud. "Producers are developing new products and product systems to fight downward pressures in the industry. A new realism has taken hold of the industry, which bodes well for creative responses to the future," notes the report.

The "swing" industries — electronics and automotive — have been hit by competition from overseas, and show no prospect of a return to substantial growth. Likewise, the slump in home computer sales has hit engineering resins, as has the general flatness of the construction, consumer, and industrial sectors of the economy.

But within that overall flat outlook the report finds promising niches that offer growth equal to the 15 percent of the two years. The specialty part of the business is which producers are retooling for very specific markets, is where growth will be found. The report finds new resins among producers, particularly within the automotive and electronics markets.

With regard to industry trends, BCC projects average annual growth at 4.5 percent through 1990, with 15 percent growth for the prototype and specialties segments. While this may be slow for the industry as a whole, clearly there are opportunities for a company that can position itself to take advantage of the new markets.

Engineering Resins Markets

	1985 (MM lbs.)	1990 (MM lbs.)
Automotive	476	650
Electronics	325	400
Consumer	250	300
Industrial	166	185
Construction	165	188
Prototype	30	60
Specialties	25	50
Other	84	85
Total	1,519	1,918

Source: Business Communications Company, Stamford, Conn.

Rohm and Haas

Continued from Page 5

tial competition" between the two companies in the sale of ion exchange resins has been eliminated.

The suit also charges that high start-up costs in the industry will probably prevent new companies from entering the market. According to the proposed consent decree, which cannot become official until at least 60 days after publication in the *Federal Register*, Rohm and Haas must offer to sell its California resin plant and its production formulas through an independent broker.

The company would be required to continue operating the plant until it is sold at least six months. In addition, Rohm and Haas would have to assist the purchaser in establishing a research and development laboratory, advise the purchaser on the production process, and help the firm hire and train a sales and technical staff to restore competition in the business.

The proposed decree would allow Rohm and Haas to retain certain French assets and

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COATINGS & PLASTICS

PVC October Hike Successful; Resin Makers Plan Next Round

Producers of polyvinyl chloride (PVC) describe October's pricing move as successful, and say they have seen prices for the resin firm between 1 and 2 cents per pound since September.

With demand and capacity utilization high, many are planning a second round of increases, to take effect December 1.

So far, Shintech Inc. has indicated that it will raise PVC selling prices across the board by 2 cents per pound in December, moving the market price for pipe and general purpose grade resin to 32 cents per pound and 33 cents per pound, respectively. Formosa Plastics Corporation USA will go along with the increase, a spokesman says, but plans to boost its selling prices, already uniformly one cent per pound lower than the industry average, by 1 cent rather than 2 cents per pound on December 1.

Demand for PVC, which soared over the summer in response to high construction rates, has been exceptionally strong this quarter.

SALES UP 9 PERCENT

Through September, sales rose 9 percent and production 7 percent over last year's year-to-date figures. October also saw a healthy market, with preliminary SPI data showing sales for the month up 11 percent over 1985 year-to-date levels.

Producers report that November sales bode well for the market; some feel that domestic PVC demand this year could well exceed earlier projections of 5 to 7 percent growth.

Unleashed tightness in domestic merchant supplies of vinyl chloride monomer (VCM), which forced many to cut PVC production earlier this year, has had little effect on current production rates. Most producers relate that they are operating at full, or close to full capacity.

Weak construction demand and discounting caused selling prices to slip 2 cents per pound over the first half of the year, with a considerable impact on margins. Moves to increase market prices in January and June, both initially successful, lost momentum; October's "increase" was actually a second reinstatement of January's selling price schedule.

PRIME PIGMENTS

LEAD OXIDE — Effective November 7, all major producers of litharge and lead oxide raised prices for the products by 1c. per pound. The increase was prompted by 1c. per pound hikes in lead metal costs.

Currently, Hammond Lead Inc., a major producer, is listing litharge at 34.5c. per pound, with lead monosulfate at 36.05c. per pound and lead oxide from 38.5 to 39.5c. per

pound. Other producers quote similar prices. The market is expected to grow 2 percent this year, producers say.

ZINC OXIDE — With zinc metal prices up to 50c. per pound, producers of zinc oxide raised prices for the pigment by 3c. per pound late last month. This is the third time prices for the colorant have been raised since July, when metal costs first began to climb.

New Jersey Zinc Company, which raised

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

Lead oxide, 1c. per lb.
Zinc oxide, 3c. per lb.

CHANGES/DOWN

None

COATINGS INDEX

The Coatings & Plastics Index reflects the prices of 13 representative materials in this sector and the quantity of each produced in 1985.

Nov. 14, 1986	306.4
Nov. 7, 1986	306.4
Oct. 17, 1986	306.4
Nov. 15, 1985	306.4

Chemical Prices Start on Page 52

prices effective October 30, is now listing American-process zinc oxide at 57c. to 59c. per pound.

St. Joe Mineral Corporation increased prices on October 21, and now lists its "500" series French-process grades at 55c. per pound, with USP and photoconductive grades at 59c. per pound and 50c. per pound, respectively.

Pacific Smelting Company raised prices on October 27, currently its French-process grade is listed at 58.5c. per pound, with activated grade at 57c. per pound.

Producers describe plastics demand for zinc oxides as excellent this year; the paint industry demand for pigment is "not bad" this year, they say, but not as strong as had been hoped, one product manager says.

PLASTICS MATERIALS

POLYVINYL BUTYRATE — Producers of PVB have been expanding capacity this year to meet with growing demand for the resin, used in laminated safety glass and related adhesive applications, as well as specialty coatings.

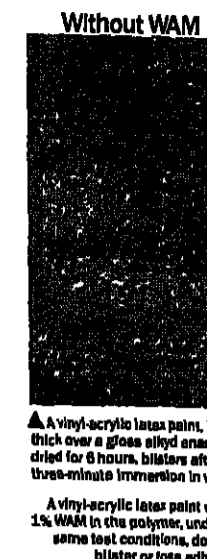
Both Du Pont and Monsanto, the only producers of PVB resin and sheet in the US, have increased PVB capacity this year. Mon-

COATING & PIGMENT IMPORTS: SEPTEMBER

CENSUS BUREAU REPORTS ON THE TOP PAINT MATERIALS.

	SEPTEMBER 1985	SEPTEMBER 1986	AUGUST 1986	SEPTEMBER 1985
Antimony oxide	1,174,035	1,339,000	2,184,411	1,354,735
Carbon black	10,459,015	2,836,588	12,725	74,345
Chrome colors				
Chrome oxide green	180,101	169,034	322,172	336,532
Hydroxide orange	149,050	142,081	129,929	146,538
Yellow	354,988	222,585	434,746	303,371
Zinc Yellow	145,324	182,851	152,588	95,179
Cobalt Oxide	20,942	131,378	22,048	114,850
Copper Oxide	N/A	N/A	40,000	35,288
Iron Oxide	777,882	926,870	385,955	474,404
Iron oxides, hydroxides, nat'l	84,032	5,084	236,105	51,992
Synthetic				
Black	94,874	23,937	146,440	49,421
Red	1,205,887	227,074	2,213,735	310,484
Yellow	1,743,745	381,419	1,780,955	418,776
Lump	540,482	427,068	919,479	1,443,558
Lead	2,711,022	526,837	2,815,416	554,254
Lead Oxide	60,000	19,822	242,000	82,921
Lead, leached	82,650	175,431	190,416	366,497
Lead, unleached	183,473	180,117	114,116	200,708
Lead, other lead	817,681	520,381	747,748	679,457
Thiuronium blue	29,840,512	18,288,635	35,222,620	21,726,215
White lead, basic carbonate	387,725	413,303	681,814	665,037
White lead (lead free)	40,000	21,829	8,912	2,154
Zinc Oxide	8,546,410	2,369,178	8,977,988	2,681,585

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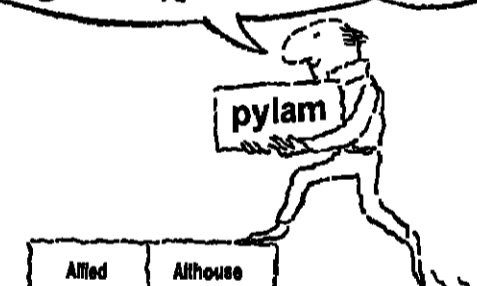
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PERFUMES & FLAVORINGS

Linalool, Linalyl Acetate Sales Send Prices and Imports Up

Linalool and linalyl acetate sales have picked up tremendously, according to industry sources, depleting current US stocks. Spot prices for the two aroma chemicals have strengthened 15 to 20 percent over the last three months in response to the increased buying activity.

Linalool increased from \$2.95 to \$3 per pound to \$3.40 to \$3.50 per pound. Linalyl acetate is quoted at \$4 per pound.

"The big rush on linalool and linalyl acetate caused the present shortages," says an aroma chemicals broker. "But it is the weaker dollar," he adds, "that is behind the activity in the first place."

Another broker, agreeing that the weak dollar has spurred foreign interest, regards the traditionally static aroma chemical pricing as a major incentive.

"Last Summer, when foreign buyers became aware that US producers were not raising their prices, in effect selling the materials at a discount, they took whatever was available." He adds that despite the flurry of buying, the currency will fluctuate again and the rules will reverse: "It is a temporary thing."

Domestic producers, meanwhile, find themselves selling material at higher prices and at a faster rate than they can generate it.

SUPPLIER SOLD OUT
"Sales of linalool and linalyl acetate have been increasing substantially both domestically and abroad," says a domestic supplier. "We are sold out of these two materials."

"This supplier emphasizes that the overseas market is not solely responsible for the market strength. 'Our domestic market has seen a significant increase as well.'"

Import figures of linalyl acetate show larger volumes coming into the US in 1986 than in 1985. January through August, 1986 imports totaled 736,843 pounds while year-end totals for 1985 reached only 696,864 pounds.

Sources speculate that circumstances similar to those affecting the synthetic hydroxy citronellal market (CMR 9/29/86 pg. 28) now pertain to linalool and linalyl acetate.

Larger producers with compounding capabilities on both sides of the Atlantic bring material into the US because fixed costs, thanks to currency exchange rates, are lower.

A representative of a major international linalool and linalyl acetate producer said such a move is "a possibility."

A market analyst attributes the export figures to a compounding switch rather than an increase in domestic consumption. "That they're switching the use of the aroma chemicals from abroad should hold true," he says.

As to the price increases themselves, industry sources are in agreement that suppliers are confident sales won't suffer. "The largest suppliers feel they won't lose business if they increase prices in line with cur-

rency differentials," says an aroma chemicals broker. He notes prices have been raised selectively to avoid straining the market.

Another aroma chemicals dealer feels prices on these larger commodities will be raised whenever possible.

"Whenever there is an opportunity to raise prices, as has been justified recently by for-

PRICES TRENDLINES

WEEK ENDING NOV. 14, 1986

CHANGES/UP

Anatto seed, Peruvian, 5c. per lb.
Balsam oil, Peruvian, 80c. per lb.
Beal oil, Madagascar, \$5 per lb.
Cedariest oil, 50c. per lb.
Fennel, Indian, 3c. per lb.
Ginger oil, Indian, \$5-7 per kilo
Palmarosa oil, Brazilian, \$1 per kilo
Saffron, \$5 per lb.

CHANGES/DOWN

Anise seed, Chinese, 5c. per lb.
Bergamot oil, \$1 per lb.
Cassia oil, 25c. per lb.
Cardamoms, mixed greens, 25-30c. per lb.
Clove leaf oil, Madagascar, 60c. per kilo
Eucalyptus oil, 70%, 75c. per kilo
Laural leaves, Turkish fancy, 10c. per lb.
Lemon oil, Italian, 45c. per kilo
Orange oil, Valencia, 10c. per kilo
Savory, Yugoslavian, 2c. per lb.
Spearmint oil, Chinese 60%, 40c. per kilo

PERFUMES INDEX

The Perfumes & Flavorings index reflects the prices of 11 representative materials in this sector and the quantity of each supplied in 1985.

Nov. 14, 1986 71.00
Nov. 7, 1986 71.00
Oct. 10, 1986 71.00
Nov. 15, 1985 71.00

Chemical Prices Start on Page 52

ign buying, then producers will seize it," he says.

Japanese producers have been raising their prices, according to an importer, to get the most from the market. "The Japanese also raised linalool prices as a reaction to other market pricings, though not as steeply."

Outlooks for the linalool and linalyl acetate market range from steady to strong. The domestic supplier foresees "the current situation continuing through the next 6 to 9 months."

A broker ties pricing to the welfare of the dollar, predicting a surge on international markets in the first quarter of 1987 and a subsequent price softening.

A market analyst also sees a direct correlation between the dollar and the linalool market, but is less confident the dollar will regain its early 1985 posture very soon.

"Indicators aren't pointing to the kind of growth necessary for substantial strengthen-

Continued on Page 69

SEED & SPICE IMPORTS: AUGUST

A SELECTION OF STATISTICS FROM THE BUREAU OF CENSUS.

	AUGUST	JULY	1986 TO DATE	AUG. '85
Cassia seed..... lb.	575,534	622,110	5,298,581	378,587
Celery seed..... lb.	3,008,075	2,112,893	16,908,146	1,745,428
Cinnamon, unground..... lb.	205,698	325,382	2,807,103	377,711
Cinnamon, whole..... lb.	129,584	182,402	1,876,582	206,187
Coriander..... lb.	185,089	148,489	1,785,553	118,481
Cumin seed..... lb.	840,877	492,047	4,488,561	171,812
Fennel seed..... lb.	180,016	801,811	5,194,684	1,011,226
Ginger root..... lb.	176,849	489,210	3,457,101	324,787
Mustard seed, whole..... lb.	1,081,377	984,405	6,081,977	1,202,090
Mustard, unground..... lb.	6,883,827	7,877,770	58,416,767	6,358,084
Onion, whole..... lb.	248,088	301,308	2,848,016	452,289
Pepper..... lb.	718,215	708,088	5,435,045	344,688
Pepper, black, unground..... lb.	782,384	730,247	11,319,987	504,489
Pepper, red, capsicum..... lb.	6,950,371	10,348,808	67,123,838	3,300,894
Pepper, white, unground..... lb.	1,080,428	1,854,210	11,332,543	1,037,641
Pepper, whole, unground..... lb.	818,881	485,211	4,382,437	828,437
Sage unground..... lb.	54,088	68,240	1,060,427	221,924
Saffron..... lb.	468,088	239,743	2,981,812	490,987
Vanilla beans..... lb.	345,532	972,421	3,886,104	141,421
	81,383	237,899	1,718,281	



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Adic acid, resin grade, bulk, hopper		1.04
cstrs, 100 lbs. equivalent	lb.	.57
c.i., 100 lbs. equivalent	lb.	.59
Agar USP, powder, 80 to 100 mesh	lb.	
50 to 100 mesh	lb.	9.50
Alcohol, 95% C-8 to C-10, tanks, f.o.b.	lb.	
works	lb.	.38
C-12 to C-15, tanks, f.o.b.	lb.	.57
C-14 to C-15, tanks, divd.	lb.	.57
C-16 to C-18, tanks, divd.	lb.	.80
Aldehyde, C-8, dms.	lb.	4.10
C-8, dms.	lb.	1.95
C-8, dms.	lb.	6.30
C-10 dms.	lb.	4.30
Algin (See Sodium alginate)	lb.	5.35
Alkyl blue, dry, flushed, 110-lb. dms.	divd.	
110 lb. dms.	lb.	3.72
Alkyl blue prices 1c. higher W. of Rockies.		3.83
Allspice Guatemalan / 100 mesh	lb.	
Jamaican, tanks	lb.	.87
Allyl alcohol, tanks, f.o.b., Bayport	lb.	1.05
Allyl bromide, 500-lbs. dms., 2,000 lbs. or more, works	lb.	.90
Allyl caproate, 25-lb. cns.	lb.	5.50
Allyl chlorid, tanks, f.o.b. works	lb.	4.60
Allyl chlorid, tanks, f.o.b. works	lb.	.65
Almond oil, bitter (See Benzaldehyde)	lb.	5.40
Almond oil, natl. bitter, NF I.P.A.	lb.	
bottles	lb.	3.50
sweet	lb.	1.24
Aloe, Caps, f.o.b.	lb.	1.50
powd., ca.	lb.	2.25
Curacao, f.o.b.	lb.	2.60
powd., f.o.b.	lb.	3.00
Alum, ammonium, tech. gran. bag	lb.	6.00
c.i., 100 lbs.	100lb.	35.00
FCC powder, fiber dms. works 100 lbs.	100lb.	55.00
Alum, potassium, tech. gran. bag	lb.	
c.i., 100 lbs.	100lb.	35.00
FCC powder, fiber dms. works, 100 lbs.	100lb.	55.00

[illegible]

cl./included
clust./industrial
cgs./kegs
c/lvs/o
c/pound
c/s./feas carload
c/s./fees truckload
c/s./liquid
c./meta
c./o./mixed aniline
point
cg./microgram
cl./manicure
cl./minim oil
c./molten
c./mating point
c/nitrogen
c./normal
cl./natural
c/s./hours
c./National Formulary
c./number
c./no./nominal

c-/ortho
ord./ordinary
os./ounce
P/phosphorus
p./part
Pac./phalite
pl./proof
phg./phosphate
photo./photographic
pkgs./packages
precip./powdered
prod./produced
pulp./producer
pt./point
pulv./pulverized
purif./purified
redist./redistilled
refid./refined
refy./refinery
resub./resublimed
ret./returnable
Rt./respectively denatured
e.d./single distilled
SE./Southwest
sc./secondary

sacs./seconds
sp.g./specific gravity
slgt./shipment
soln./solution
old./standard
syn./synthetic

tanks/railroad tankcar
tech./technical
tbl./tablets
l./lubricated
l./lubricant
to/rs./ refers to section of
of 60 pounds
TV./transpiratory volume
vary allowance
L.W./livestock

UGB./United States
Pharmaceuticals

vis./viscosity
Vib./vibratory motion
& pattern

W/Wet
w/wet./wetness
w/wet./water value

nt of 2,000 pounds of the basic constituent or other standard of the material for
the constituent multiplied by the unit price shown in Chemical Abstracts

5000 pounds of the material.

USFoyat, dms., tonlots same base		
Bevan gum, Sumatra, etc.	lb.	1.73
Benzene, N.F., 1,000 lbs. or more, f.o.b.	lb.	1.80
new, f.o.b.	lb.	3.50
NF, 1,000 kilos or more, f.o.b.	kg.	7.45
old, 1,000 kilos or more, f.o.b.	kg.	4.35
22. Benzoyl disulfide (see Mercaptobenzoyl thiozyl dms.)		
Benzozole, flake, dms., 1,000 lbs. or more, f.o.b. works	lb.	6.10
powd, dms., 1,000 lbs. or more, same basis	lb.	6.20
photo-grade, dms., 1,000 lbs. or more, same basis	lb.	9.90
Benzonitrile, rehd., dms., 1 l., frt. equid.	lb.	.87
lake, frt. equid.	lb.	.80
Benzyl chloride dms., 1 l., frt. lake, frt. equid.	lb.	.57
Benzyl peroxide, regular gran., 1,000-lb. lots or more, bgs., works, frt. equid.	lb.	.74½
paste, 50% and 55% formula, dms., pails, frt. equid.	lb.	2.35
Benzyl acetate, dms.	lb.	1.71
Benzyl alcohol, N.F. 1 l. dms. frt. equid.	lb.	1.20
lake, same basis	lb.	1.26
photo grade, 1 l. dms., same basis	lb.	1.37
lake, same basis	lb.	1.40
tech. grade, 1 l., dms., same basis	lb.	1.34
lake, same basis	lb.	1.32
tech. same basis	lb.	1.38

[illegible]

Cadmium chloride, purif. cryst., 100-lb. dms., 1-l. works.	3.73	-
Cadmium chloride, 25-lb. dms., 100-lb. lots, frt. aild. E. of Rockies	11.33	12.36
light shade, bble, same basis	9.18	10.25
medium shade, bble, same basis	10.69	15.20
medium light shade, bble, same basis	10.26	14.40
Cadmium, CP yellow, alt. shades, bble., 100-lb. lots, frt. aild. E. of Rockies	6.10	7.07
Cadmium fluoroborate, liq. conc., dms., 1-l. works, frt. equald.	2.27	-
medium light shade, bble., same basis	3.22	-
Cadmium-mercury lithopone, mercon shade, bble., frt. aild. E. of Rockies	4.80	-
Cadmium metal ingots or sticks, 100-lb. lots, or, dms.	1.20	1.50
Cadmium nitrate, purif. flake 400-lb. dms., 2-l. 1-lb. ship. pub.	2.10	2.10
Cadmium-selenide lithopone, orange, light shade, bble., 400-lb. lots, frt. aild. E. of Rockies	3.97	4.00
deep shade, bble., same basis	4.47	4.60
Cadmium-selenide lithopone, red, dark shade, bble., same basis	6.77	6.80
light shade, bble., same basis	5.57	5.90
medium light shade, bble., same basis	5.72	5.76
medium shade, bble., same basis	6.37	6.40
mercon shade, bble., same basis	7.47	-
Cadmium-sulfate lithopone, yellow, alt. shades, bble., same basis	2.97	3.00
Cadmium sulfide, 50-lb. dms., any quantity, 1-lb. ship. pt.	4.05	-
Castile, dom. USP, 100-lb. dms., 1-l. frt. aild.	5.80	-
imp. cryst., any qt., powd., dms., 10,000 lbs. or more	5.80	-
Catalin, 50-lb. dms.	1.50	1.70
Catalin, 1-l. dms.	26.90	38.00

Calcium carbide, std., generator size, bulk, c.i., f.o.b. works.....	402.00	-
Calcium carbonate, pulverized, 325-mesh, bgs., bulk, f.o.b. works.....	46.00	-
alumin., 54% solids, bulk, c.i., same basis.....	97.00	100.00
72% solids, same basis.....	103.27	-
quickslime, gran., ind., bulk, work- ing.....	100.93	-
Calcium carbonate, precip., bgs., c.i., works.....	0.0630	1.60
Calcium carbonate, precip., bgs., d.i.t.....	385.00	446.00
Calcium carbonate precip., medium, bgs., c.i., works.....	110.00	150.00
precip. dense, bgs., c.i., same treated, bgs., c.i., works.....	265.00	-
ultrafine, USP, bgs., c.i., works.....	217.00	225.00
Calcium chloride, calc. reg. grade, 77- 80% flakes, bulk, c.i., works.....	153.00	-
100-lb. bgs., c.i., same basis.....	196.00	-
anhyd., 84-87%, flake or pellet, bulk, c.i., same basis.....	217.00	-
80-lb. bgs., c.i., same basis.....	278.00	-
brining grade, 80-lb. bgs.....	285.00	-
Calcium chloride, liq., 100 percent ba- sis, l.c., l.t., barge.....	98.75	-
45% same basis.....	118.00	-
Calcium chloride, USP, reg. grade, 22- dms., l.t., frt. aquad.,.....	.80	-
Calcium citrate, purif., 200-lb. dms., 10,000 lbs. or more, f.o.b. works.....	3.82	-
Calcium cyanamide, indus. c.i., d.i., dms., works.....	400.00	460.00
Calcium gluconate, USP, powd., l.t., lb. Calcium hydride, lump, dms., 25- 1,000-lb. lots, works.....	1.80	-
10.50	13.25	-
Calcium hypochlorite, 100-lb. bags, nuckledose ship't. E. of Rock- ies.....	92.40	-
Calcium hypophosphite, dms., bulk, 500 kilos or more.....	13.75	14.50
Calcium iodide, FCC grade, 100-lb. bags.....	5.50	-
Calcium iodide, 50- kilo dms., f.o.b. works.....	23.85	25.65
Calcium lactate, NF, powd., pentahy- drate, dms., 24,000 lbs. or more, f.o.b. works.....	2.00	-
NF, gran., trihydrate, same basis, lb. special gran., dried grade, same ba- sis.....	2.10	-
2.80	-	-
Calcium maphosphinate, 100-lb. bags, f.o.b. plant, E. of Rockies.....	.85	-
d-Calcium pantothenate, USP, 100- 500-kilo lots.....	12.50	-
d-Calcium pantothenate, feed grade, c.i., frt. aqd., 250 kilos or more.....	8.00	8.50
d-Calcium pantothenate, calcium citrate complex, feed grade, 160 grams per lb., f.o.b., frt. aqd., 500 lbs. or more.....	2.75	-
Calcium phosphate, dibasic, feed grade, 18 1/2% P, bulk, c.i., l.t., f.o.b. works.....	228.00	-
Calcium phosphate, dibasic, dihydrate, USP bgs., c.i., works.....	62.50	-
anhyd., USP, same basis.....	71.76	-
dentifrice grade, same basis, 60 lbs. Calcium phosphate, monobasic, monohydrate, food grade, bgs., c.i., l.t., works, frt. aquad.....	50.50	-
anhyd., food grade, same ba- sis.....	54.95	-
tribasic, NF, gran., frt. aquad.....	62.50	-
Calcium propionate, dms., 2,000 lbs. or more f.o.b. frt. aqd.....	.50	.55
Calcium silicate, hydrated, bgs., c.i., works.....	.07	-
Calcium silicate, paint grade (see Wollastonite). Calcium, NF, mild powd., 100-lb. dms., f.o.b. works.....	8.50	-
Camphor, chlorinated (see Camphor, chlorophene). Camphor, monobromated, dms., kgs.....	3.63	3.70
Camphor, synth., tech., 168-lb. ds., 5,000 lbs. or more.....	1.80	-
USP, powd., 165-lb. dms., 5,000 lbs. lots or more.....	2.38	-
syn., refd., 1-oz. tablets, chit., 1,000- lb. lots or more.....	3.50	-
Camphor oil, yellow, 28-lb. dms., white, dms.....	1.65	-
spec. grav. 1.070, dms.....	2.65	2.85
Camphor oil, Indonesian, dms.....	17.60	-
Camphor wax, crude, bgs.....	1.80	-
refd. pure, bgs.....	2.10	-
Capric acid, coml. pure, dms.....	.80	.85
tanks.....	.60	.68
Caprylic aldehyde (aldehyde C-10) dms., c.i., works.....	3.96	5.35
Caprolactam, monomer, flake, bgs., l.t., f.o.b. shipping point.....	.87	-
molten, tanka, same basis.....	.86	-
Caprylic alcohol, 98-99% tanks, c.i., works.....	.35	-
Caprylic acid, coml. pure tanks.....	.73 1/4	-
Caprylic (see Papper, ref.). Caproleum oil (see Caproleum oleum). Caproleum oleum, NF, frt. dom., papper, dms.....	11.00	-
NF, from African papper, dms., 500,000 pungey.....	9.00	-
1,000,000 pungey.....	17.00	18.00
Caraway oil, yellow, 28-lb. dms.....	22.00	25.00
Caraway seed, Dutch, bgs.....	.58	.69
Egyptian, bgs.....	.60	.53
Carbon black, furnace, fast extruding, FEF, h.c., c.i., works.....	2125	-
h.c., c.i., works.....	2425	-
general purpose (GPF), bulk, c.i., works.....	2075	-
h.c., c.i., works.....	2375	-
Carbon black (NAB), No. 60, extrud- ing.....	-	-

Carbon Black, low structure, bulk, c.i.	240	26
workable, "w" grades, lb.	270	29
intermediate-super-abrasion (BPA), lb.	25	-
bgc, c.i. works, lb.	28	-
super-abrasion (BAP), cut, lb.	31	-
workable, lb.	4060	-
bgc, c.i. works, lb.	210	-
semi-reinforcing (SRA), bulk, c.i.	240	-
Carbon black, thermal, medium, bgc, c.i. works, lb.	30	30
bulk, "w" grades, lb.	32	34
Carbon black oil, base, gal. re-		
fineries, bbls.	10.50	12.50
f.o.b. W. coast refineries, bbls.	10.50	12.50
Carbon disulfide, t.c., f.o.b. works ton	420.00	
Carbon disulfide, 99.5% constant		
dims., c.i., frt. alt., lb.	36	-
tech, dims., c.i., frt. alt., lb.	31	-
tank transport (min. 4,000 gals.)	24	-
alt., lb.		
Carboxymethyl cellulose (see CMC)		
Cardamom, of. NF, bot., lb.	60.00	-
Cardamom, Guatemalan, lb.	2.90	-
Cardamom, Yucatan, lb.	5.75	70.00
Carnine, No. 40, NF, bulk, 100-lb. lots	135.00	140.00
or more, divd., lb.		
Casaba wsg, Parnahyba, No. 1, yellow, bulk, ton lots, lb.	1.95	2.05
Cassa, No. 2, yellow, bulk, ton lots, lb.	1.75	1.90
North Country, No. 2, refined, bgc, ton lots, lb.	1.85	1.85
Cannula wsg, North Country, No. 2, centrifuged, bgc, ton lots, lb.	1.10	-
North Country, No. 3, refined, bgc, ton lots, lb.	1.30	1.45
Powdered cannula wsg, 20 to 100 mesh, 20c. per lb., higher		
B-Carotene, 1% vegetable oil, semi-solid suspension, 400,000 A units per gram, 33 lbs. or more, lb.	32.75	-
B-Carotene, liq. in vegetable oil, 500,000 A units per gram, 33 lbs. or more, lb.	40.75	-
B-Carotene, dry, beads, 10%, 167,000 A units per gram, 33 lbs. or more, lb.	28.85	-
d-Carvone, 25-lb. can, syn., lb.	48.00	-
Cascone, lb.	7.00	7.25
Cassia sagrada bark, bulk, lb.	1.00	-
Cassia, liq., acidulated, gal. 500,000 A units per gram, 33 lbs. or more, lb.	1.45	-
meash, Australian, edible, same basis, c.i., lb.		
Australian, indust. same basis, c.i., lb.	1.365	-
Cassella oil, 503 med. grade, frt. alt., 100% base, lb.	3.70	-
Cassa, Korihii "A" bgs., lb.	1.08	1.20
"B" bgs., lb.	.85	1.00
Cassia, 100% base, lb.	1.60	-
Castor oil, raw, No. 1, Braz. tanks, lb.	31	33
USP 5-B, lb.	74	-
refld. deod., 5-9 dms., lb.	78	-
refld. 5-9 dms., lb.	75	-
dehydrated, bodied, 50% base, lb.	65	-
dehydrated, un bodied, tanks, lb.	65	-
Castor oil, acids dehydrated, dims., lb.	1.10	-
richoleate acid, lb.	.79%	83
Castor oil, 503 med. grade, frt. alt., 100% base, lb.	154.00	-
Castoreum, natl. one, c.i., lb.	18.00	35.00
syn. one, 45-lb. can, 50-59 dms., lb.	11.00	-
Catcho, C.F. 100% base, lb.	7.93	-
dms., f.o.b. b., lb.	3.71	-
tech, bgs., t.i., same basis, lb.		
Cedaryl pomash (see Pomash, caustic)		
Cedaryl oil, (see Cedarwood oil)		
Cedarleaf oil, dims., lb.	17.50	-
Cedarwood oil, Texas, dims., one, lb.	1.75	2.50
Virginia, lb.	4.75	-
Cedryl, lb.	6.25	-
Cedryl esters, diet, dms., lb.	4.25	6.30
Celery seed, Indian, bgs., lb.	.48	-
Celery seed oil, lb.	37.00	-
Celulose acetate, poplar, bgs., lb.		
divd. E, lb.	1.30	-
Celulose acetate butyrate, powd., 17% butyl, content, bgs., t.i., c.i., lb.	1.75	-
38% butyl content, bgs., divd. E, lb.	1.59	-
50% butyl content, bgs., divd. E, lb.	1.81	-
50% butyl content, bgs., divd. E, lb.	1.83	-
Celulose, pure, 100% base, lb.		
24,000 lb. lots or more works, f.o.b. Hopewell, Va., lb.	1.60	1.70
std. low or medium vis., bgs., c.i., lb.	1.60	1.90
low vis. c.i., lb.	1.35	-
Cerium chlorate CeO ₂ , 50% base, lb.		
Cerium hydroxide 90% CeO ₂ , dms., lb.	6.40	-
77% CeO ₂ , dms., wt. wt., lb.	4.20	1.90
Cerium oxide, optical grade, 99.9% lb. lots or more, divd., lb.	1.85	1.90
Chalk alcohol, NF, cns., c.i., frt. alt., lb.	.88%	1.21
Chalk (see Calcium carbonate)		
Chaulmoogra, 100% base, lb.	4.25	4.40
Roman, cs., lb.	2.90	-
Egyptian, whole, lb.	4.74	3.00
Chenopod oil, blue, Egyptian, lb.	545.00	-
blue, Hungarian, lb.	375.00	-
Chenopodium oil, NF, cns., lb.	15.00	-
Chicoago acid, dry, bbls., frt. alt., lb.	13.80	-
Chilled (see Pepper, red)		
Chloric anhydride, tech., dms., t.i., works, lb.	1.30	-
Chlorinated paraffin, 40% chlorine, bulk, divd., 20m l., lb.	.48	1.40
Chloroform, 99.9% pure, lb.	.48	1.40
50% chlorine, same basis, lb.	.48%	1.40

1000

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PORTER November 17, 1900

DDVP (see Dimethyl dichlorovinyl phosphate).

tanks, works.

... ..	49.00	45.25
... .. lb.	.86	

emio chloride; 42 lb. photo grade
dms. o.l. work 100 lb. B:10

links, some beads	lb.	44	-	1
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WEEK ENDING NOV 14, 1986

drochloric acid, anhyd. (see Hydrogen chloride).

هذه في الجبل

Perchloroethylene, dry cleaning grade, dist. tanks, dwd.	lb.	2.84	
Industrial, grade, consumers, tanks, dwd.	lb.	.31	
Perf. adm. 28 oz. 484 cc. 16 oz.	lb.	2.55	
Permanent red 28 oz. 484 cc. 16 oz. sals, dms, fr. alt.	lb.	5.25	
Perf. adm. 28 oz. 484 cc. 16 oz. sals, dms, fr. alt.	lb.	5.25	
Perf. adm. 28 oz. 484 cc. 16 oz. sals, dms, fr. alt.	lb.	3.25	
Petroleum, USP, snow white, dms, c.l., relly.	lb.	5.00	
Petroleum, USP, lily white, tanks, relly.	lb.	.375	
Petroleum, USP, lily white, tanks, relly.	lb.	.319	
Petroleum, USP, lily white, tanks, relly.	lb.	.376	
Petroleum, USP, lily white, tanks, relly.	lb.	.310	
Petroleum, USP, lily white, tanks, relly.	lb.	.370	
Petroleum, USP, lily white, tanks, relly.	lb.	.305	
Petroleum, USP, lily white, tanks, relly.	lb.	.305	
Petroleum, USP, lily white, tanks, relly.	lb.	.30	
Petroleum, USP, lily white, tanks, relly.	lb.	.350	
Petroleum, USP, lily white, tanks, relly.	lb.	.345	
Petroleum, USP, lily white, tanks, relly.	lb.	.280	
Petroleum pitch (see Asphalt, petroleum).			
Petroleum sulfonate, 65-67% sulfonic acid, 100-lb. tanks, dwd.	lb.	4.84	.49
Petroleum sulfonate, 65-67% sulfonic acid, 100-lb. tanks, dwd.	lb.	.49	.49
Petroleum sulfonate, 65-67% sulfonic acid, 100-lb. tanks, dwd.	lb.	.49	.49
Prices for 51% sulfonic content 20 per lb. lower on correct			
Phenacetin USP, powd., 200-lb. dms., 1,000-lb. lots, dwd.	lb.	2.20	
Phenacetin USP, powd., 200-lb. dms., 1,000-lb. lots, dwd.	lb.	2.22	2.45
p-Phenylene di-NF, dms., 500-1000 lbs., l.o.b. works	lb.	16.50	
Phenobarbital USP, dms., 500-1000 lbs., l.o.b. works	lb.	27.00	
Phenol, syn. tanks, fr. alt.	lb.	.25	.29
p-Phenolsulfonic acid, 65% so ₂ N, dms., c.l., l.o.b. works	lb.	.84	
Phenolsulfonic acid, 65% so ₂ N, dms., c.l., l.o.b. works	lb.	.84	
Phenolsulfonic acid, 65% so ₂ N, dms., c.l., l.o.b. works	lb.	2.33	
Phenolsulfonic acid, 65% so ₂ N, dms., c.l., l.o.b. works	lb.	2.08	
Phenolsulfonic acid, 65% so ₂ N, dms., c.l., l.o.b. works	lb.	1.04	
Phenylacetic acid, pure cryal., 25-lb. cns.	lb.	4.50	
di-Phenylalanine, dms., 25-lb. cns.	lb.	3.45	
1-Phenyl-3-carbonyl pyrazolone-5, dms., 200-lb. lots, dwd. E. I.	lb.	8.00	
n-Phenylenediamine, cast, dms., c.l., l.o.b. works	lb.	2.07	
o-Phenylenediamine, flaked, dms., l.o.b. works	lb.	3.25	
p-Phenylenediamine, flaked, dms., l.o.b. works	lb.	4.00	
Phenylephrine hydrochloride, USP 100-1000 lots or more	lb.	175.00	185.00
Phenylenediamine, dms., 25-lb. cns.	lb.	3.15	
Phenylenediamine, dms., 25-lb. cns.	lb.	2.20	
p-Phenylenediamine, dms., 25-lb. cns.	lb.	1.50	
Phenylenediamine, dms., 25-lb. cns.	lb.	5.50	6.80
Phenylenediamine, dms., 25-lb. cns.	lb.	3.50	
1-Phenyl-2-methyl-5-pyrazolone, dms., 250-lb. lots dwd. E. I.	lb.	1.80	
o-Phenylenediamine, dms., 25-lb. cns.	lb.	1.35	2.00
p-Phenylenediamine, dms., 25-lb. cns.	lb.	1.65	
Phenylenediamine hydrochloride, 100-1000 lbs.	lb.	24.00	28.00
Phenylacetylene, purif. cryal., dms.	lb.	2.75	
Phenylacetylene, purif. cryal., dms.	lb.	2.25	
Phenylacetylene, purif. cryal., dms.	lb.	2.35	
Phosgene, 1-ton ret. cys., 5 to 6-cyl. quantities	lb.	.55	.87
Phosphate rock, 14% phosphoric acid, run of mine washed, 55-58% p.p.i. bulk c.l. min.	lb.	23.15	
Phosphate rock, 14% phosphoric acid, run of mine washed, 55-58% p.p.i. bulk c.l. min.	lb.	28.00	
Phosphoric acid, com'l. and tech. grades, 75% tanks	lb.	29.00	
Phosphoric acid, com'l. and tech. grades, 75% tanks	lb.	31.00	
Phosphoric acid, com'l. and tech. grades, 75% tanks	lb.	33.50	
Food grade prices \$2.00 above tech. grade.			
Phosphoric acid, agricultural grade, 62-54% a.p.a., 50-lb. tanks	lb.	3.10	
Phosphoric acid, agricultural grade, 62-54% a.p.a., 50-lb. tanks	lb.	3.45	
Phosphoric acid, agricultural grade, 62-54% a.p.a., 50-lb. tanks	lb.	1.00	
Phosphoric acid, agricultural grade, 62-54% a.p.a., 50-lb. tanks	lb.	.81	
Phosphoric acid, agricultural grade, 62-54% a.p.a., 50-lb. tanks	lb.	.40	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	50.00	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	45.00	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.82	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.38	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.35	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.30	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.27	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	.85	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	8.45	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	8.30	
Phosphorus pentasulfide, powd., dms., c.l. works	lb.	8.10	

Phthalocyanine blue, toner, water dispersible, 100 lbs. sample	9.45	17.30
Phthalocyanine green toner, all grades, 100 lbs. sample	9.30	14.00
Phthalocyanine green (toner), resinated, 100 lbs. sample	8.85	9.45
Phthalyl isocyanate, dms., 500-1000 lbs.	6.61	-
Picoline, 60% methanol solution	2.61	-
Picric acid, pure paste, 25-lb. cins., c.i. dry basis, f.o.b. Charlotte, N.C.	6.00	-
tech., pass 85-90% methanol sol.	5.00	-
tech., 85-90% methanol sol., f.o.b. Charlotte, N.C.	2.20	-
Pigment green 8, 100 lbs.	1,600.00	2,000.00
Pipecolic acid, USP.	1.80	-
Pimento leaf, dms.	13.90	-
Pine oil, 80% min. alcohol content, bulk, 100 lbs. works	47.00	53.00
pine cins., c.i., 1,100 lbs.	51.00	64.00
a-Phenene, perfume grade	1.82	-
tech. grade	.18	.23
b-Phenene, perfume grade, tanks	2.30	-
tech. grade, tanks	.35	.40
Piperazine, anhyd., dms., 11, frt. afd. E.	1.80	-
Piperazine citrate, 36%, dms., 1,100 lbs. frt. afd.	2.25	2.35
Piperazine dihydrochloride, 44%, dms., 1,1, frt. afd.	2.00	-
Piperazine hexahydrate, 44%, dms., 1,100-lb. lots, frt. afd.	1.80	-
Piperazine phosphate, 42%, dms., 1,1, frt. afd.	1.80	-
Piperidine dist. 98% min., dms., c.i., 1,1, works	6.92	-
plasticizer, 80% min., divd., 500 lbs.	5.00	-
Platinum, metal, works	533.00	-
Polycarbonate resin, pellets, nat. 1,1, frt. afd.	1.84	1.88
Polyester resin, unsaturated, g.p., orthophthalic, 100 lbs. tech. grade	.51	.53
isophthalic, same basis	.56	.62
Polyethylene resin, high-density, blow molding, g.p., hopper cars, frt. afd.	.44	.52
injection molding, g.p., hopper cars, frt. afd.	.43	.48
extrusion, g.p., hopper cars, same basis	.47	.48
wire and cable, nat., hopper cars, same basis	.64	.65
wire and cable, black, same basis	.66	.75
Polyethylene resin, low-density, extrusion, g.p., hopper cars, frt. afd.	.35	.36
clarify film, hopper cars, frt., afd.	.36	.37
pallet shrink film, hopper cars, same basis	.36	-
extrusion coating, hopper cars, same basis	.38	.42
g.p., hopper cars, frt. afd.	.37	.38
Polyethylene resin, low-density g.p. resin	.38	.40
blown film resin	.40	.43 1/2
cast film resin	.40	.45
Polyethylene resin, low-density injection molding, g.p., hopper cars, same basis	.45	.48
line wire, CATV, power cable, 100 lbs. wire and cable thermoplastic voltage, natural color, same basis	.70	1.15
wire and cable, XLPE low voltage, 14% carbon black, same basis	.80	.80
wire and cable jacketing, black 100 lbs.	.68	.73
Polypropylene sulfate, USP, 50-lbition units	.62	-
Polyoxyethylene acrylonitrile monotearate, dms., 20,000-lb. lots, works	.73	-
Polyoxyethylene acrylonitrile monotearate, dms., 20,000-lb. lots, works	.73	-
Polypropylene resin, homopolymer, g.p., nat. 1,1, frt. afd.	.45	.48
polymer, same basis	.50	.66
high impact, same basis	.53	.60
Colored material do. per lb. higher for each grade	.47	-
Polystyrene resin, crystal, nat., hopper cars, frt. afd.	.47	-
impact, nat., hopper cars, same basis	.48	.50
high heat, high impact, same basis	.48	.52
expandable beads (EPB), pigking grade, 1,000-lb. cins.	.68	-
modified, same basis	.71	.73
Polyvinyl alcohol, fully hydrolyzed, medium viscosity, 60%, 1,1, divd.	1.00	1.05
partially hydrolyzed, medium viscosity, 60%, 1,1, divd.	1.06	-
Polyvinyl chloride resin, g.p., homopolymer dispersion, 60%, 1,1, divd.	.38	-
g.p. suspension, bulk, same basis	.50	-
pipe grade, bulk, same basis	.47	-
lin grade, same basis	.37	.47
Polyvinyl chloride, g.p. homopolymer dispersion, same basis	.58	.61
g.p. copolymer suspension, same basis	.58	.61
Polypropylene, 200 lbs.	.45	.48
Turkey, bags	.68	-
Potash agricultural (see Potassium sulfate)	13.00	-
Potash, caustic, 100 lbs. tanks, works	16.00	-
West Coast, 50% basis, tanker extermal	16.00	-
reg. flake, 88-92%, 400-lb. dms. c.i. works	42.35	-
Potassium acetate, NF grade, 100 lbs. works E.	.90	1.81
Potassium bicarbonate, tech. gran. reg. works	.31	-
Potassium dichromate, USP grade, dms., 1,1	.72	-

Potassium bichromate, gran., 400-lb. dms., c.l., works.....	.48	-
Potassium bifluoride, tech. dms., l.l. works, frt. equivd.....	.46	.49
Potassium bitartrate, NF, gran., powd., 100-lb. dms., c.l., works.....	.90	1.20
Potassium boroborate, acid dms., 100-1,000-lbs. works.....	18.00	20.00
Potassium bromate, gran., powd., 200-lb. dms., c.l., f.o.b. works.....	1.06	-
Potassium bromate, NF, gran., c.l. f.o.b. works.....	1.12	-
Potassium carbonate, liq., 47% K_2CO_3 tents, t.w., works.....	14.80	-
dms., c.l., works.....	20.05	-
calched, 98-100% K_2CO_3 , hopper cars or trucks, works.....	32.50	-
bgr., c.l., l.l., works.....	10.30	35.20
dms., c.l., works.....	38.40	-
Potassium carbonate, purif., 400-lb. dms., 5-dm. lots.....	.40	.46
Potassium chlorate, cryst. dms., c.l., works.....	1.14 1/2	-
powd. dms., c.l., works.....	.30	-
purif., gran., 325-lb. dms., c.l., shipping point.....	.40	-
Potassium chloride, chemical grade, 98.95% KCl, bulk, c.l., f.o.b. works.....	105.00	-
USP cryst. dms.....	1.12	-
USP gran. dms.....	.87	-
USP powd. dms.....	.67	-
Potassium chloride, agricultural (see Potassium muriate), Potassium chromate, purif., (cryst. dms., works).....	.57	-
Potassium citrate, NF, gran., 200-lb. dms., frt. aidd.....	.93 1/2	-
Potassium cyanide, dms., 20,000-lb. lots, f.o.b. l.i., works.....	1.32	-
Potassium dichromate (see Potassium bichromate)	-	-
Potassium fluoride, tech. dms., c.l., l.l., works, frt. equivd.....	1.40	1.42
Potassium fluoride, anhyd., dms., c.l., works.....	1.68	-
Potassium gluconate, dms., l.l., f.o.b. works.....	1.45	-
Price W. of Darnier 4c. per lb. higher, Potassium guaiacul sulfate, dms., 800 lbs. or more frt. equivd.....	2.10	-
Potassium hydroxide, tech. (see Potash), Potassium hydrosulfide, USP, pellets, 100-lb. dms., c.l., works, frt. equivd.....	1.81	1.33
Potassium iodide, USP, gran., cryst. dms., 1,000-lb. lots, dmd.....	10.72	12.39
Acid grade truckload.....	11.32	13.55
Potassium manganate, 100-lb. dms., bgs., works, c.l., ton	59.00	-
ton basis 40% K_2SO_4 and 55% $MgSO_4$ bulk, works.....	67.00	-
Potassium metabisulfite, gran., dms., l.l., works.....	.44	-
Potassium muriate, 60-82.4% min. K_2O , std., f.o.b. Sask., Canada.....	44.00	45.00
soluble, fine std., f.o.b. Sask.....	47.00	-
coarse, f.o.b. Sask.....	48.00	50.00
gran., f.o.b. Sask.....	50.60	51.50
Potassium nitrate, gran., 100-lb. ton, c.l., dmd. SE.....	287.00	274.00
prilled.....	277.00	284.00
tech., gran., bgs., c.l., min. 60 tons, dmd.....	470.00	-
Potassium oxalate, neutral tech. gran., powd., 300-lb. dm., frt. equivd.....	2.54	-
Potassium pentaborate, gran., bgs., c.l., works.....	1.01	-
dms., same basis.....	1.08	-
Potassium pentaborate powder 15c. per lb. higher, Potassium perchlorate, dms., c.l., works.....	.78	-
Potassium permanganate, 100-lb. ing. bulk, hopper trucks, works.....	1.09	-
50-lb. dms., same basis.....	1.20	-
150-lb. dms., same basis.....	1.17	-
Potassium permanganate, USP 80-lb. bgs., works, c.l., l.l., works.....	1.38	-
Potassium persulfate, 225-lb. dms., 24,000 lbs. or more, f.o.b. cwt. c/l same basis.....	78.80	-
Potassium polyphosphate tetrabasic, bgs., c.l., l.l., works, E. Int. liq. bulk, bulk.....	72.50	63.75 64.00
Potassium salicylate, USP, gran., 200-lb. dms., 2,000 lbs. or more, works, frt. aidd.....	1.52	-
USP, powd., 300-lb. dms., 2,000 lbs. or more, same basis.....	1.42	-
Potassium silicate, soln., 28-30.1% Be, 2.5 ratio, t.c., l.i., works.....	18.90	-
dms., c.l., l.l., works.....	23.90	-
Potassium silicate, 40-40.8 Be, 2.1 ratio, t.c., l.i., works.....	25.05	-
40-40.8 Be, 2.1 ratio, dms., c.l., l.l., works.....	32.05	-
Potassium silicate, electric grade, 30-30.4 Be, 2.1-2.2 ratio, l.l., works.....	28.10	-
dms., c.l., l.l., works.....	33.10	-
solid or glass, 2.15 ratio, dms., c.l., l.l., works.....	53.90	-
solid or glass, 2.5 ratio, dms., c.l., l.l., works.....	45.85	-
*Ratio indicates percentages by weight of SiO_2 divided by percentage by weight of K_2O	-	-
Potassium silicofluoride, bgs., c.l., frt. equivd.....	.11 1/2	.15
Potassium-sodium tartrate, NF, gran., powd. dms.....	.60	1.20
Potassium sorbate, l.l., dmd.....	2.50	3.10
Potassium stearate, dms., frt. aidd.....	N.A.	-
Potassium sulfate, agricultural grade, min. 90% K_2O liq. bulk, c.l., f.o.b. works.....	180.00	180.00

Potassium tetraborate, gran., bgs., ul.		
dms., same base	.b.	1.10
Potassium tetraborate powder, 10% per ton	b.	1.15
Potassium thiocyanate, USP, cryst.		
226 dms., 6-dm. lot.	.b.	4.91
tech. cryst., dms., 2,000-lb.	.b.	.82
Potassium titanate, ctina., i.l.		
works	.b.	.7194
Potassium-zincum fluoride, tech.		
dms., t.i., works, frt.	b.	1.24 1.50
Prednisone USP, dms., 5 kilos .	.b.	.78
more	.b.	1.03
Prednisolone acetate, USP, dms., gran		
kilos or more	.b.	1.12
Prednisolone, tanks, USP, dms., gran		
kilos or more	.b.	1.12
Procaine hydrochloride, USP, anesthetic grade, dms., 2,000-lb.		
lots, divd.	.b.	4.85 &
Procaine hydrochloride		
USP, ampule grade, dms., 1,000- lb. lots, frt. equivd.	.b.	4.95 & 5.50
Propylene glycol, f.o.b. .	.b.	.359
Propionic acid, syn., pure, tank, f.o.b.	.b.	.23E
E	.b.	.33%
n-Propyl acetate, tanks, divd.	.b.	.33%
n-Propyl alcohol, tanks, divd.	.b.	.42
n-Propyl gallate dms., 100 to 2,000-lb. lots, divd.	.b.	11.80
n-Propyl-p-hydroxybenzoate, USP		
tech., 500 kilos lot.	.b.	10.80
Propyl paraben (see n-Propyl-p-hydroxybenzoate)		
Propyl thioralcal, dms., 50-kilo lots or more	.b.	55.00
n-Pyrglyamine, dms., 5-lb. divd.	.b.	.75
Pyriprene, polymer grade, f.o.b. Tex. and La. Gulf Coast points	.b.	.178
chemical grade same basis	.b.	.175
Pyriprene glycol, indust., tanks, f.o.b.	.b.	.40
USP, tanks, f.o.b. E	.b.	.43
Pyriprene glycol monomethyl ether, tanks, Divd. E.	.b.	.47
Pyriprene oxide, f.o.b. .	.b.	.49
frit, equivd.	.b.	.48
Payitum asst, USP powder bgs.	.b.	1.50 175
Pumice, doml., fine, 4F-0, bgs., ton		
coarse, 2-extra coarse, bgs., ton		
medium, 0V-1-1/2, bgs., ton lots	.b.	270.00
coarse, 2-extra coarse, bgs., ton		
Pumice, c.i., fines, bgs., ton		
lots f.o.b. East Coast	.b.	290.00
medium, bgs., ton lots, f.o.b. East Coast	.b.	350.00
coarse, bgs., ton lots f.o.b. East Coast	.b.	300.00
Pyrazolone red (ton 38), dms., .		
works.	.b.	13.00 15.6
Pyrethrum flowers, fina grd. 0.8% pyrethrins, ton lots, frt. adslb.		
Pyrethrum, purif., 20% pyrethrins. dms., works.	.b.	37.50 375
Pyridine, refld., 2-deg. c.i., works		
tanks	.b.	6.50
Pyridoxine hydrochloride, USP, 100 kilo or more, divd.	.b.	36.00
Pyrite, Canadian 48-60% S. mines	.b.	4.80 50
Pyrogallic acid (see Pyrogallic)		
Pyrogallol, 100-lb. dms., 1,000-lb. lots, divd.	.b.	13.70 65

Q

Quassia chips	.b.	.57
Quinacridone maroon, dms., frt.		
red, dms., frt. alid.	.b.	27.00 35%
red, dms., frt. alid.	.b.	24.25 37%
violet, dms., frt. alid.	.b.	24.90
Quinine seed, bgs.	.b.	2.00 175
Quintidine sulfate, USP, 1,000-oz.		
feed grade, 2,000-oz. or more, oz.	.b.	4.20 &
Quinine hydrochloride, NF, 1,000-oz. dms., 2,000-oz. or more, oz.		
Quinine sulfate, USP XVIII, 1,000-oz. dms., 2,000-oz. or more, oz.	.b.	2.40 250
Quinolone, dms., U.I., frt. equivd.	.b.	1.48
tanks, same basis	.b.	1.43

R

R salt tech., 304 molecular wt.	.b.	2.12
Racemorithrine, USP,		
500-600 kilos.	.b.	6.80
500-600 kilos.	.b.	6.80
500 or more kilos.	.b.	6.80
feed grade, 98% min., c.i., U.I.	.b.	1.07
Racemorithrine, feed grade, 28 kilos	.b.	.589
Rauwolfia serpentina root, powd. ba. dms.	.b.	22.00
red ceramie. No. 40 (see Ceramie)		
Resinate, 25-lb. lots, Alcantara oxide, red		
Resepine, USP, cryst., bott.	.b.	40
Resorcinol tech., bgs., U.I., works		
divd.	.b.	3.90
Resorcinol, USP, cryst., 50 kilos		
or more, equivd.	.b.	9.35
powd. dms., same basis	.b.	9.80
Resorcinol monooxalate, dms., 1,000- lb. lots, or more	.b.	1.90
Rhodamine red toner, molybdated, PTMA, dms., works		
tungated, PTMA, dms., f.o.b.	.b.	11.00
works	.b.	10.00
Rhodiol, 25-lb. lots	.b.	12.50
syn. dms.	.b.	12.50
Rhubarb root, India, whole, bgs., powd., bgs.	.b.	6.20
Riboflavin, feed grade, 28 kilos	.b.	1.07
Riboflavin, USP, 25 kilos	.b.	1.07

[illegible]

Sodium bicarbonate, USP, powd., reg. grade, bgs., c.i., l.i., works, frt. equiv.	100 lbs.	17.05	
coarse, same basis	100 lbs.	18.08	
fine, same basis	100 lbs.	17.20	
gran., same basis	100 lbs.	17.85	
100 lbs., fine, same basis	100 lbs.	17.80	
Sodium bicarbonate, bgs., c.i., l.i., works, frt. equiv.	lb.	.57	
Sodium bifluoride, 400-lb. dms., c.i., frt. equiv.	lb.	.78	
100-lb. bgs., work, same basis	lb.	.76	
Sodium bisulfate, bgs., c.i., work, frt. equiv.	lb.	176.00	
dms., c.i., l.i., works	100 lbs.	13.00	
Sodium bisulfite, anhyd., bgs., c.i., l.i., work, East.	100 lbs.	28.80	
works, West	100 lbs.	32.00	
Sodium bisulfite, conc., 35%, bkg., 100% basis, work, East.	100 lbs.	20.80	
soh., 100% work, West	100 lbs.	20.00	
photographic	43% soh.	100 lbs.	21.80
Sodium borate NF, gran., bgs., c.i., work, same basis	lb.	.51	
powd., same basis	lb.	.52	
Sodium borohydride, powd., dms., 1,000-5,000 lbs. works	lb.	18.88	21.80
Sodium borohydride, stabilized water soln., 12% NaBH ₄ , 100% basis, 3,000 gal. tankwagons	lb.	17.46	
Sodium bromide, 98%, gran., 400-lb. dms., f.o.b. works	lb.	1.04	
Sodium carbonate, dichalcide, bgs., c.i., l.i., work, same basis	ton.	264.00	
Sodium carbonate, cryst. monohydrate, bgs., c.i., l.i., work	ton.	392.00	
Sodium carboxymethyl cellulose (see CMC)	lb.		
Sodium chromate, crystal bull., f.o.b. delivered, N.E.	ton.	330.00	
Sodium chloride, S.E.	ton.	335.00	
Sodium chloride, cryst., 450-lb. dms., c.i., work	lb.	.27	
Sodium chloride, tech. (see Salt)	lb.		
Sodium chloride, USP, gran., bgs., c.i., work	lb.	.29	
Sodium chloride, tech., dms., c.i., work	lb.	1.17	1.27
Sodium chromate, anhyd., bgs., c.i., l.i., work	lb.	.87	
Sodium chromate, tetrahydrate, bgs., c.i., l.i., work	lb.	.84	
Sodium citrate, gran., 400-lb. dms., c.i., l.i., N.Y.	lb.	1.95	
Sodium citrate, USP, gran., dihydrate, 100-lb. bgs., l.i., f.o.b. shipping point	lb.	.74½	
Sodium cyanate, dms., 1,000-lb. lots	lb.	.85	
Sodium cyanide, briquettes or gran., 85% min., 20-lb. dms., min. divd.	lb.	.71	
Sodium diacetate, anhyd., dms., c.i., work	lb.	.88	
Sodium diacetate, tech., bgs., c.i., l.i., divd. E. of Rockies	lb.	.81	.87
Sodium diacetate, tech., 50-lb. dms., c.i., work	lb.	.52	
Sodium hydroxide, pure, gran., l.i., mixed l.i., f.o.b. shipping point	lb.	2.60	2.85
aces W, of Denver 20, per pound higher.			
Sodium formate, bgs., c.i., l.i., work	lb.	1.77	
Sodium fluoroborate, tech., gran., dms., l.i., work, frt. equiv.	lb.	.80	
Sodium fluoride, white, 97%, 400-lb. dms., c.i., work, bgs.	lb.	.6345	
100 bgs., c.i., same basis	lb.	.80	
USP powd., 200-lb. dms., l.i., f.o.b. shipping point	lb.	4.69	
Sodium formate, bgs., c.i., l.i., work	lb.	.20	
Sodium gluconate, tech., 50-lb. bgs., 2,500 lbs. or more frt. equiv.	lb.	.86	
Sodium hydride, oil dispersion, 80% NaH, 167-lb. dms., 10 dms., c.i., work	lb.	1.68	
Sodium hydrofluoride (see Sodium sulfhydrate)	lb.		
Sodium hydroxide, dms., c.i., l.i., f.o.b. shipping point, E. of Rockies	lb.	.84	
Sodium hydroxide, tech., 100-lb. dms., c.i., l.i., work, frt. equiv.	lb.	.98	1.08
Sodium hydroxide, tech. (see Soda, caustic)	lb.		
Sodium hypochlorite, bgs., c.i., l.i., dms. f.o.b. works	lb.	1.425	1.60
100-lb. dms.	lb.	1.47	1.62
Sodium hyposulfite (see Sodium Bisulfite)	lb.		
Sodium iodide, USP, can, 600-lb. lots, dms. frt. equiv.	lb.	14.72	
Sodium lauryl sulfate, 30%, tanks, f.o.b. works	lb.	.29	.32
Sodium lignin sulfonate, bgs., c.i., l.i., work	100 lbs.	25.50	
Sodium metabisulfite (see Sodium Bisulfite)	lb.		
Sodium metaborate, octahydrate, gran., bgs., c.i., l.i., work	lb.	.38	
Sodium metaborate, tech., 40-lb. dms., c.i., l.i., work	lb.	.49	
Sodium metasilicate, 12-lb. bricks, dms., c.i., work	lb.	.83	
Sodium metasilicate, 40,000-lb. dms., c.i., work	lb.	.97	
Sodium metasilicate, 40,000-lb. dms., c.i., work	lb.	.70	.80
Sodium metaphosphate, tech., bgs., c.i., f.o.b. shipping point	lb.	61.50	
Sodium metasilicate, 100 lbs. equiv.	lb.	68.25	
Sodium metasilicate, anhyd., bgs., c.i., work	lb.	27.25	
Sodium metasilicate, 100 lbs. equiv.	lb.	25.30	
Sodium metasilicate, bgs., c.i., f.o.b. shipping point	lb.	18.95	
Sodium metasilicate, 100 lbs. equiv.	lb.	17.20	
Sodium molybdate, anhyd., dms., f.o.b. works, 100 lbs. and over	lb.	4.87	
Sodium molybdate, 100-lb. dms., c.i., l.i., same basis	lb.	4.12	
Sodium molybdate, dms., c.i., l.i., f.o.b. works	lb.	2.00	
Nitrate, USP, bgs., c.i., f.o.b. frt. equiv.	100 lbs.	34.60	
Nitric acid, conc., industrial, ton	ton	264.00	292.00
oil, c.i., work	ton	250.00	
concentrated, 100-lb. bgs., c.i., Alt., or work	ton	295.00	214.00
oil, c.i., same basis	ton	182.00	
imp., agricultural, bulk, c.i.	ton		

Sodium orthosilicate, tech., anhyd., bgs., c.l., works	100 lbs.	34.50	
Sodium metasilicate, tech., hydrated, flake, dms., c.l., works	100 lbs.	27.45	
bgs., c.l., works	100 lbs.	26.25	
Sodium metasilicate, 99%, bgs., l.l., works	lb.	.45	
Sodium pentachlorophenate, beads c.l., 30.00-50.00	lb.	.67	
bgs.	lb.	.85	
Sodium pentaborate (see Pentaborate-sodium).			
Sodium perborate, tetrahydrate, tech., bgs., c.l., l., works	100 lbs.	32 $\frac{1}{2}$	35 $\frac{1}{2}$
Sodium persulfate, 225-lb. can, 24.00 lb. or more, f.o.b. plant	lb.	83 $\frac{1}{2}$	
55-lb. can, same basis	lb.	.82	
Sodium phosborate, tech., Pentaborate-sodium).	lb.	.76	
Sodium phosphate, anhyd., dibasic tech., bgs., c.l., l., works, ft. equiv.	100 lbs.	54.60	
food grade, same basis	100 lbs.	57.50	
Sodium phosphates, monobasic, tech., same basis	100 lbs.	55.75	
food grade, same basis	100 lbs.	56.75	
ribasic, tech., same basis	100 lbs.	52.25	52.75
food grade, same basis	100 lbs.	51.00	
chlorinated, same basis	100 lbs.	31.50	
cryst., tech., same basis	100 lbs.	30.50	
cryst., food grade, same basis	100 lbs.	35.00	
USP, dried, powd., bgs., dms., works	lb.	.95	
Sodium picramide, lvs. part, 200-lb. dms., dry basis, lvs.	lb.	5.50	20 $\frac{1}{2}$
Sodium propionate, dms., 2,000-lb. or more, f.o.b. ft. silo	lb.	.54	
Sodium pyrophosphate, tech., bgs., c.l., works, ft. equiv.	100 lbs.	58.25	
food grade, non-leavening, bgs., c.l., works, ft. equiv.	100 lbs.	61.25	
Sodium pyrophosphate, tech., dms., c.l., l., works	lb.	.3690	
Sodium pyrophosphate, tetrahydrate, anhyd., tech., bgs., c.l., l., works, ft. equiv.	100 lbs.	44.75	
bulk, hopper class, same basis	100 lbs.	42.50	
food grade, bgs., c.l., l., same basis	100 lbs.	53.00	
Sodium silicate, USP, 200-lb. can, dms., 1,000-lb. lvs. or more, works, ft. equiv.	lb.	3.00	
USP, powd., 200-lb. can, 1,000-lb. lvs. or more, same basis	lb.	3.05	
Sodium sesquicarbonate, 100-lb. works	ton.	170.00	
bgs., c.l., l., works	100 lbs.	198.00	
Sodium silicate, solid, or glass, 3.22-3.25 ratio, bulk, c.l., l., works	100 lbs.	15.70	
bgs., c.l., l., works	100 lbs.	27.75	
1.95-2.00 ratio, bulk, c.l., l., works	100 lbs.	20.30	
bgs., c.l., l., works	100 lbs.	22.15	
ash, 37.6° acid, 3.22-3.25 ratio, bulk, bulk, c.l., l., ft. equiv.	ton.	6.30	
"Ratio" indicates percentage by weight of Na ₂ O			
Sodium silicofluoride, bgs., c.l., l., works, ft. equiv.	100 lbs.	17.95	19.75
Sodium stearate, dms., 2,000-lb. can, 2,000-lb. lvs.	lb.	.22	
Sodium sulfate, NF XII, powd., dms., 2,000-lb. lots	lb.	.23 $\frac{1}{2}$	
tech., works, Gulf	ton.	90.00	95.00
Sodium sulfate, West, bulk, c.l., works, ft. equiv.	ton	90.00	101.00
bulk, East, same basis	ton	113.00	114.00
Sodium sulfate, photo grade, 100-lb. bgs., c.l., works	lb.	47.00	53.00
Sodium sulfhydrate, flake, 70-72% dms., c.l., l., works, ft. equiv.	ton	500.00	
liq., 44-46%, tanks, works, ft. equiv.	ton	500.00	
Sodium sulfide, flake, dms., c.l., works, E. ft. equiv.	ton	470.00	
bgs., same basis	ton	410.00	
Sodium sulfide, fused, dms., c.l., works, E. ft. equiv.	ton	240.00	
Sodium sulfite, anhyd., tech. 95-90% bgs., f.o.b. works	ton	23.78	
Sodium sulfolanate CP (see Sodium thioacetate).			
Sodium tetraborate (see Borate).			
Sodium tetrafluoride, liq. 34% dms., c.l., works, ft. equiv.	ton	540.00	
Sodium thioacetate, purif., cryst. 250-lb. dms., 5 dms. or more f.o.b. works	lb.	3.28	
tech., anhyd. dms., 2,000-lb. can, or more, works	lb.	.57	
Sodium thiosulfate, tech., photo-grade, anhyd., 100-lb. bgs., c.l., l., works, ft. equiv.	ton	45.50	
cryst. pentahydrate, c.l., l., same basis	100 lbs.	28.50	
Sodium trichlorate, dms., c.l., works	lb.	.144	
Sodium trichlorate, 85% bgs., c.l., ft. silo, bgs., c.l., works	lb.	.28	
Sodium triphosphate, tech., bgs., c.l., l., works, ft. equiv.	100 lbs.	39.75	
bulk, hopper, same basis	100 lbs.	37.50	
food grade, bgs., c.l., l., works, ft. equiv.	100 lbs.	48.50	
sls.	100 lbs.	48.50	
Sodium tungstate, tech. high moly, 100-lb., 10.00-lb. or more, ft. equiv.	ton	5.00	5.50
Folin grade dms., 10,000-lb. or more, same basis	lb.	8.00	
Sodium-ammmonium phosphate, purif., c.l., works, ft. equiv.	ton	.52	
Sodium-formaldehyde sulfoxylate, tech., dms., c.l., l., works	lb.	.91	
Sodium-thionyl sulfate, dms., 1,000-lb. lvs. or more, works	ton	.28	
tech. dms., any quantity, works	lb.	.16	
Sodium naphtha, petroleum, straight aromatic, ref. 320°-390° F., 20° F. m.p., tanks		1.52	
New Jersey	gal	1.41	
Houston	gal	1.41	
London	gal	1.41	
Direct receipt, straight aromatic, ref. 360°-410° F., 30° F. m.p., tanks	ton	1.36	
New Jersey	gal	1.30	1.36

WEEK ENDING NOV 14, 1986		
Sorbitan monoesterate, dms., c.i., l.i.	30,000 lb. min., f.o.b. works.....	.76
Sorbitan monoesterate, c.i., l.i., 30,000 lb. min., f.o.b. works.....		.80
Sorbitol USP, ref. 70% aqueous, dms., c.i., f.o.b. shipping point.....		.35
tanks, l.i. shipping point.....		.30
gran. dms., c.i., l.i., works.....		.70
powd. dms., c.i., l.i., works.....		.68
Soybean meal (See Oil, Fats & Waxes market report.)		72
Soybean oil (See Oil, Fats & Waxes market report.)		
Soybean oil acidulated, soapstock, 95% acid, tanks, New York Ct.....		.14
Soybean oil, acid, oil, dist., dms., tanks.....		.48
s.d., dms., c.i., l.i., works.....		.43
tanks.....		.47
Spermin leaves, imp. bis.....		2.50
Spermint oil, Far West, native.....		9.50
Chinese, 50%.....		5.60
Far West Scotch.....		18.50
Spruce oil, dms.....		8.00
J. John's bread, edible, bis.....		.29
Stannic chloride, anhyd., dms., works.....		N.A.
Stannic oxide, dms., works.....		N.A.
Sodium chlorate, anhyd., dms., wks. l.i., works, frt. equiv. lb.....		2.50
Stannous sulfate, dms., works.....		N.A.
Stannous sulfide, dms., works.....		N.A.
Steracid acid, double pressed, bulk lb.....		.26
single-pressed, bulk.....		.28
tri-pressed, bulk.....		.32
Stramonium leaves, bgs.....		.15
Streptomycin sulfate, USP, bulk.....		47.00
Strychnine carbonate, glass grd., bgs, l.i., works.....		37.74
Strontium nitrate, 50-15 bgs, c.i., works.....		51.50
Styrene monomer, 99.6% min. t.c., l.i., f.o.b. works.....		22
Styrene-acrylonitrile resin, nat. bulk, l.o.b. plant.....		.77
cryst. bulk, same basis.....		.77
same basis.....		.77
Styrol acetate, dms.....		2.35
Succinic acid, purifi. cryst. dms., l.i., frt. equiv. lb.....		2.00
Sucrocin-anhydride, dms., c.i., l.i., f.o.b. works.....		1.71
Sucrose, refd., white, bgs, c.i., f.o.b. ref. E 100 lbs.....		33.10
Sucrose acetate, laurylate, 80% basic, c.i., divd.....		1.18
tanks, divd.....		1.10
100%, dms., t.i., divd.....		1.18
Sucrose octa-acetate, denaturing grade, 100-lb. dms., f.o.b. works.....		12.50
Sulfabenzamide, dms., 600 kilos kifo.....		29.50
Sulfabenzamide-sodium, dms., 500 kilos.....		25.00
Sulfacaramide, USP, dms., 500 kilos.....		20.00
Sulfadiazine, USP, powd. dms., 500 kilos.....		43.00
Sulfadiazine-sodium, USP, dms., 500 kilos.....		60.70
Sulfamerazine, USP, microcrystals, dms., 500 kilos.....		33.50
USP, powd., dms., 500 kilos.....		32.00
Sulfamethoxazole, USP, powd., dms., 50 kilos.....		13.00
Sulfamethazine, powder, dms., 500 kilos.....		9.00
Sulfamido acrylate, bgs, long tons, works.....		36.00
Sulfamic acid, gran., dms., c.i., l.i., works.....		2.80
Sulfonilic acid, 100 lbs. long ton, frt. equiv. lb.....		.30
Sulfonic acid, tech., bgs, l.i., f.o.b. works.....		.67½
Sulfonazirine, veterinary grade, dms.....		8.00
Sulfur, conc. bright, molten, dms., f.o.b. vessels, Gulfports.....		150.00
Sulfur, c.i., refd., recovered, divd., Houston, Texas.....		125.90
ext terminal, Rotterdam.....		135.00
f.o.b. tanks, Alberta, Canada, for US delivery, ex-Texas, Ft. Worth.....		102.00
Sulfur, conc. 99.9% min. purity, conk. flour, 50-lb. bgs, c.i., mines base.....		13.60
ump, same basis.....		13.60
Sulfur, refd., 99.5% min. purity, rolls 50-lb. bags, c.i., mines base.....		17.50
Sulfur, refd., 99.5% min. purity, rolls 50-lb. bags, c.i., mines base.....		20.00
Sulfur, refd., sublimed NF, 99.98% min. purity, 50-lb. bgs, c.i., mines base.....		23.00
Sulfur, rubbersulfur, 99.5% min. purity, conk. roll, 50-lb. bgs, c.i., mines base.....		14.90
Sulfur, 99.5% min. purity, 50-lb. mesh, same basis.....		16.80
Sulfur dichloride, dms., c.i., works, frt. equiv. lb.....		.34
Sulfur dioxide, bulk, t.c., f.o.b. works.....		.174
Tar, pitch.....		230.00

هنا في الجاهل

ME SELECT used machinery

LARGE BIRDS

(12) 40" x 60" Bird decanter, 316 S/ST, 15/3 deg. contour, 5" pitch, single lead conveyors w/Stellite hard surfacing, 80:1 gearbox, 100 HP V-belt main motor drive. New late 60's. Excellent condition. Limited Use. Immediately Available from Stock.

(2) 32" x 50" Bird decanter, 316 S/ST, 15/3 deg. contour, 5" pitch, single lead conveyors w/Stellite hard surfacing, 80:1 gearbox, 75 HP V-belt drive. Excellent condition. Limited Use. Immediately Available from Stock.

WYSSMONT TURBO DRYER
Stainless Steel, mdl L-12, steam heated, 48" dia S/ST trays & sides w/heater controls.

VACUUM DOUBLE DRUM DRYERS
(2) Blaw Knox designed double drum dryers, 18" x 48" x 36" x 120", chrome plated, each w/vacuum chambers & vacuum pump package. Excellent condition. Ready to Ship.

WYSSMONT DRYER
Model N-22, 8' dia trays 22 high, with stainless steel contact parts. May be shipped in one piece. Steam heated.

ROTARY FILTERS
Ametek 8' x 12' rotary w/belt discharge, 316 stainless, new 1974 - Excellent condition.
-Ametek 5' x 8' rotary w/belt discharge, 316 stainless. New 1974 - Excellent condition.

STAINLESS DRYER
Louisville stainless steel steam tube dryer, 8' dia x 40', stainless steel clad shell w/stainless steel steam tubes.

Also Available:
Roto-Louvre mdl 900-32, 9' dia x 32' long, steam heated, 30 HP motor, all fans & Flex-Clean dust collector.

CRYSTALLIZER
Titanium contact parts, 8000 lbs p/hr capacity. New 1976. Complete and still installed.

RAYMOND ROLLER MILLS
*** Just Purchased ***
(3) Raymond high side roller mills, model 5057, double whizzer separator, fan, feeder, cyclone, duct work & bucket elevator.

AMETEK ROTARY PRECOAT FILTERS
(1) 2' x 3', T304 sanitary stainless, complete station w/vacuum receiver, pump, mix tank & Nash vacuum pump. Rebuilt.
(3) 10' x 16', 316 stainless steel, 100 HP Roots vacuum pumps, receivers, interconnecting piping, etc. Rebuilt.
(1) 3' x 3', string discharge, 316 stainless, Incl S/ST agitated through, vari speed mtr, vari speed dry on drum, 316 stainless S/H vacuum pump. Excellent condition.

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DELAVAL MAPX-207 S/S OIL SEPARATOR
SHARPLES AS-16, 16V, 28 S/S clar./sep. (Rebuilt)
BAKER PERKINS HS-10W S/S "Lab" peeler
BIRD 24x60 ST/CCF design
WESTFALIA SAMR 5036 SS 15 HP
DELAVAL ACVO Disc/Nozzle SS 20 HP
KRAUSE-MAFFEI 18.5" Pusher S/S (Rebuilt)
SHARPLES P-3400, 4000 SS horiz. solid bowl
ALFA-LAVAL NX-2148S DECANter 20 HP
SHARPLES 48"x30" T-1800 AUTO 316 SS (2)
SHARPLES Mark 3 14" SS perf. auto basket

MIXERS/BLENDERS

P/K 2, 10, 15, 75 cu. ft. SS Twin Shell w/bar
5, 20, 60, 70, 320 cu. ft. S/S dbl. cone w/drv
120, 135, 165, 175, 250, cu. ft. dbl rls S/S
300 gal. J.H. Day Pony Mixer S/S w/can
(2) Viteco 100 cu. ft. S/S Nauta Mixers

DRYERS

Patterson 48 cu. ft. rot. vac. cyl. S/S 3' x 7'
P/K 5, 10, 370 cu. ft. SS liq-Sol. Processor
LOUISVILLE 6x45 SS Rot. Air-Steam
BOWEN 4" No. 2 TOWER SPRAY DRYER S/S GAS NOZZLE
Spray Dryer, Bowen 30" lab, Niro 48" utility S/S

SAVE

PLANT SITE

SPECIALS

30"x72" Bird horiz. solid bowl cent. oil
Shaw-Walton 350 Rot Air Dryer w/Bumer. C/S
60" Sweco S/S 1-deck screen
2000 gal. Pfaudler G/L reactor w/gt.
Bird 40x60 316 S/S Cent. 11411 100 HP
P/K 5, 10, 370 cu. ft. SS liq-Sol. Processor
40"x120" S/S Rotas Vib. Screen 2-deck
12,000 gal Frp Vert. Tanks (2)
1000 gal. Pfaudler G/L reactor 75"/75" w/gt.
Bird 1x20 816 S/S Centrifuge
P/K 5' x 45" SS CONVEYOR DRYER
22,500 Gal. Tank/Silo SS Vert 12 ft. x 24 ft.

WE HAVE MANY MORE ITEMS - LET US KNOW WHAT YOU NEED

FILTERS

SPARKLER 352 sq. ft. S/S Mod V-R-32
SPARKLER 18-D-5 S/S Vert. Tank Press Leaf 18"
2.5' x 13' S/S Vacuum Belt Filter
18" x 24" 36" 42" P/P Presses C.I. Poly S/S
SPARKLER HRC 150, 200 S/S Horiz. Press. Leaf
35,50,150,300 sq. ft. Press Leaf S/S

TANKS/REACTORS

29,000 GAL. HORIZ. 316SS Tanks 40' x 2'
200 Gal. S/S Reactor 150"/150" W/gt.
1,200 GAL. T-316 SS REACTOR 30 7/8" J.K. w/gt.
12,000 Gal. Horiz. SS w/Top Agit. D.H. Wds.
16,000 Gal. S/S Reactor 50"/50" 30 HP Agt.
30,50,150,200, 1000 Gal. S/S Reactors 100"/75"

MISC. SPECIALS

PFAUDLER 1500 gal. S/S Reactor
MG 1000, 2000, GPH HOMOGENIZER 3000 gal.
85 HP MODULATIC Boiler 250 gal Gas Fired
SIMPSON 1V4, S/S MIX MILLER
6" x 78" Autoclave 150" w/track QOD
FITZ Mills S/S D, D12, FAS012 & Chloroplast
7'x10' length AUTOCLAVES 100" Code W/gt.
-100-10,000 sq. ft. H/Exch'r's S/S & C/S
150 cu. ft. P/K Twin Shell oil. 10 HP
-100-10,000 gal. G/L Tanks & Reactors
Micro - Pulv. 1SH S/S 5HP W/Screw Feed

SAVE **VIDEX WAREHOUSE SPECIAL** **SAVE**
THEO WALTER 225 Gal. Horisite Lined
S/S Reactor 100" F.V. Int.-40" jkt.
10 HP Van - Drive Dbl. Mat. Agt. **JUST PURCHASED**

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4 x 40' Bartlett-Snow Rotary Kln
3 x 20' Bartlett-Snow Rotary Kln
3 x 20' Bartlett-Snow Rotary Dryer
M-400 (16") Bird Pusher Centrifuge, 316SS
18" Bird Horizontal Screen Bowl Centrifuge
12' x 15' Jeffrey Fluid Bed Dryer, S/S
60" Wide Proctor & Schwartz Belt Dryer
Marley Cooling Tower
Multi-Stage Evaporator System
USED EQUIPMENT
9' x 250' Traylor Rotary Kln (6)
6' x 43' Traylor Rotary Kln (6)
6' x 40' Atlas-Chalmers Rotary Coolers (6)
6' x 16' Traylor Ball Mills, 450 HP (4)
Belt Conveyor up to 54" wide, up to 600' long
10' x 24" Atlas-Chalmers Jaw Crusher
Size 322 Atlas-Chalmers Hydro-Cone Crusher
250 TPH Pennsylvania Hammermill (4)
9' x 30' Chattanooga Peckle Mill (2)
8' x 12' Chattanooga Peckle Mill (2)
Misc. Pumps, Compressors, Screens, Collectors, Feeders and Conveyors

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PLANTS.
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DOLLARS PAID. NO DEAL TOO
BIG OR TOO SMALL.

DRYERS

Drum Dryers/Flakers
(1) 24" dia. x 36" Buflowac SS dbl. drum
dryer
(2) 24" dia. x 100" Blaw Knox C.I. dbl. drum
dryer
(3) 24" dia. x 17' Sandvik SS belt flaker
(4) 24" dia. x 10' Buflowac C.I. dbl. drum
dryer
(5) 24" dia. x 120" Blaw Knox C.I. dbl. drum
dryer
(6) 24" dia. x 28" drum flaker, chrome plated
body
(7) 48" dia. x 40" C.I. flaker, mfg. by Buffalo
Foundry
(8) 48" dia. x 40" drum flaker, nickel plated
drum, mfg. Blaw-Knox

Fluid Bed
(1) 60 Kg. Aeromatic, Batch, 6' x 2', 55,000
lb. air, Aeromatic Model ST 100, sanitary SS
(2) 100 Kg. Aeromatic Model ST 100, sanitary
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CMR MARKETPLACE

CHEMICAL MARKETING REPORTER'S CLASSIFIED ADVERTISING SECTION

COPY DEADLINE: Wednesday Noon preceding date of publication.

RATES/Classified Ads: \$57.75 for 36 words or less; \$9.75 for each additional six words or fraction. No display. First two words printed in bold face type.

Non-display advertisements payable in advance, except for contract customers (not subject to agency commission).

REPLIES: Send replies to classified ads with box numbers to **CHEMICAL MARKETING REPORTER**, 100 Church St., New York, NY 10007-2694.

INFORMATION: For further classified advertising information, call 212/732-9820.

BUSINESS OPPORTUNITIES

26 percent interest in an Organic Synthesis Specialty Plant. Available for \$35,000. Centrally located in Pennsylvania. Good for entrepreneur having products to be manufactured or strong following for custom manufacturing. Quick turn-around possible. Contact CMR Box 748.

We want to acquire a profitable chemical export trading company with sales of \$5 million. Write: Marfan Curtis, 7888 Browning Rd., Pennsauken, NJ 08109 or call 609-685-8484.

CHEMICALS OFFERED

Glycerine natural USP 99.5 — new drums — low low prices regular supply — available from New Jersey/Baltimore/Houston/West Coast warehouses. Inquire now. Write C.M.R. Box No. 729.

Pharmaceuticals Offered Excess Inventory: 650mg SR Aspirin in 100's and 75mg SR phenylpropylamine HCL in 30's. Vorex Laboratories, P.O. Box 3817, Englewood, CO 80112. Phone — 303/799-4498.

CHEMICALS OFFERED/WANTED

Chem/Mart Corp. will buy all of your surplus or off spec chemicals, plastics, pharmaceuticals, resins. Current bargain offerings: 22M lbs. Pantacitricol Terephthalate, Der 587 Resin; 40 dr. Ethomene T-30; 19M lbs. Kralon D4141; Calcium Acetate, U.S.P. and Gallic Acid. Prompt efficient nationwide service. Chem/Mart Corporation, 640 N. LaSalle St., Chicago, IL 60610. (312) 767-8800.

CHEMICALS WANTED

Active Buyer of surplus chemicals, pigments, dyes, resins, waxes, plastics etc. Call toll free 1-800-631-3337 or 017-828-6736. Deer Polymer Corp. Chemical Div. 17 Industrial Drive, Holden, MA 01520.

All Surplus — Chemicals — Resins — Oils — Colors — Solvents — Plasticizers — Specialties — Intermediates — bought by: Ramoth Chemical Co., Inc. 52 Vesey Street, P.O. Box 5167, Newark, NJ 07105. Phone: (201) 589-7774.

Cash For your surplus chemicals, resins, colors, pharmaceuticals, dyes, other raw materials, by products, wastes, residues and off-spec materials. Monarch Chemical Inc., 5500 Main Street, Williamsport, NY 04221 (716) 632-4000. Telex 918133.

Realize Top Value from the sale of your surplus chemicals. We buy surplus chemicals, plastics, resins, waxes, etc. Bonmar Chemical Co., P.O. Box 484, Fair Lawn, NJ 07410. Phone: (201) 791-2448; Telex: 13-0434.

Resyn Corp. will buy your surplus chemicals, resins and resin raw materials — prime or off-specification. Resyn Corp., P.O. Box 63, 1540 W. Blanche St., Linden, NJ 07036. (201) 882-8787.

Sludges, residues byproducts, catalysts, off spec or contaminated material, surplus etc. containing any base, precious, refractory, minor etc. metals. Sharper Alloys Inc., P.O. Box 231, St-Jean-Sur-Richelieu, Quebec, Canada. Tel 514-349-2534.

Surplus Chemicals: Wanted, high prices paid for surplus chemicals, resins, pharmaceuticals, colors, plasticizers, solvents, waxes, etc. Prompt and efficient service. Try us for better prices. ChemSales Inc., 107-27 180th Street, Jamaica, N.Y. 11433. (718) 658-0400-01.

Surplus Wanted: Chemicals, pharmaceuticals, dyes, solvents, pigments, waxes, other raw materials. Over 55 years service Chemical Service Div., P.O. Box 948, 97-05 Ongley St., Rockville Centre, NY 11571. (516) 536-5833.

We Buy Surplus chemicals, colors, resins, solvents, plasticizers by-products, etc. Over 50 years of service to industry. Eastern Color & Chemical Co., Inc. 85 Roosevelt Ave., Dept. C.P.O. Box 1029, Valley Stream, N.Y. 11582. (516) 791-4445.

EQUIPMENT OFFERED

Diamantier has used process equipment for sale: Columns, exchangers, heaters, reactors, pressure vessels, tanks, etc. Midwest Steel Co., Inc. 9825 Moers Road Houston, Texas 77075. 713/991-7843.

Drying System — Complete Chemical Unit Operation consisting of 2-42" x 120". Atmospheric Double Drum Dryers with chrome drums, all stainless steel accessories including S.S. hoods SS conveyors, and S.S. bucket elevators coupled to a 5' x 25' S.S. concentric gas fired rotary dryer. All with required drives, motors, steam accessories and approved gas unit for rotary drying. S.S. Cyclones S.S. scrubbers, etc., all available and in place. This drying system designed for continuous operation and thru put of 40,000 lbs. to 100,000 lbs. dry dependent on product required. Will consider sale of part or whole. Write or call: Jerchem Industries, 40 East 4th, Newark, N.J. 07105. 201-344-0800. Attention: Bob or Julie.

CHEMICAL PROFILE

Continued from Page 70

OUTLOOK

The possibility of further phosphate bans, which now affect 25 percent of the US detergent market, overshadows the business. Provided no further bans ensue, liquid encroachment should balance tripoly growth within the powdered detergent segment, resulting in relatively flat demand for the next several years.

Generic Drugs Are Not Always Priced Lowest

A survey of almost 900,000 prescriptions has found that generic drugs are not always cheaper than their brand name counterparts, even though pharmacies pay less for the generics.

In fact, says Bernard Bloom, an economist at the University of Pennsylvania, the survey determined that two common drugs — one used to treat menopause and the other high blood pressure — generally are more expensive in generic form.

Mr. Bloom said he could not explain the reason for the price difference but said the implications were clear. "My best advice to the consumer is just shop around," he said.

In Friday's edition of the Journal of the American Medical Association, Mr. Bloom said they examined 892,000 prescriptions written in 1984 for 21 brand name drugs and their generic equivalents at 1,400 pharmacies in 39 states.

The researchers found that, on average, brand name drugs were slightly more expensive than generics, but there were notable exceptions.

It says "Lasix," the brand name for a diuretic prescribed for high blood pressure, was the same price or cheaper than its generic equivalent two-thirds of the time.

"Premarin," a brand named hormone prescribed for menopausal symptoms, was as good or better a buy than generic estrogen in 60 percent of the cases examined.

The researchers also discovered wide price variations for all drugs and found "an important number of individual consumers" who paid more for a generic than they would have for the brand name.

"We were shocked by the results. I mean literally shocked," Mr. Bloom remarked. "I don't want to heap any abuse on either pharmacists or drug manufacturers, because I can't really be sure who's to blame. The consumer doesn't care who's to blame. They just want to know which is the least expensive."

Twenty-five states require pharmacies to pass generic savings along to consumers, but only 19 insist the full savings be preserved. Mr. Bloom said he does not support more restrictive laws because the current ones already are impossible to enforce.

Overall, the price differences per pill were usually minor, involving no more than "a couple of bucks" for each prescription. Mr. Bloom said. "But for the elderly," he noted, "a couple of bucks is a lot of money, especially if you're refilling your prescription every couple of weeks."

Schering Corp. Sues to Protect

Schering Corporation, Farma Food A/S and associated companies have filed suit in the Federal District Court of New Jersey in Newark, charging a manufacturer and distributor of diet products with trademark infringement and unfair competition.

The complaint charges that the defendants are distributing a diet product bearing the trademark "Fiber Slim" that infringes the plaintiffs' "Fibre Trim" trademark. The complaint also charges that the label of the Fiber Slim product simulates the label and carton of the "Fibre Trim" product.

Farma Food owns the registered trademark "Fibre Trim" and manufactures the

product. Schering Corporation has exclusive U.S. distribution rights.

The defendants named in the civil action are Nature's Blend Products, Inc., of Parsippany, N.J., and Bernard Farber, its principal.

Schering and Farma Food are seeking preliminary and permanent injunctions prohibiting the defendants from continuing to supply diet products under the trademark "Fiber Slim" or any other trademark confusingly similar to Farma Food's trademark "Fibre Trim," or from otherwise competing unfairly with the plaintiffs. The complaint also seeks treble damages, the recovery of defendants' profits from the sale of the product complained of, and an award of attorneys' fees and legal expenses.

On Oct. 9, Schering filed suit against American Pharmaceutical Co., Inc., of Parsippany, N.J., and earlier, on Aug. 26, against K Laboratories, Inc., of Sun Valley, Calif.; K Laboratories, Inc. (formerly known as K Laboratories, Inc.), of Skokie, Ill.; Centric Pharmaceutical Laboratories of Largo, Fla. and Jewett Drug Co. (Inc.) of Aberdeen, Md.

The purpose of these suits is the protection of the packaging graphics of Schering's "Afrin" nasal decongestant spray, its "Trimeton" allergy product, and its "Actin" athlete's foot remedy, as well as protection of Schering's trademark "Fibre amine." These suits are still pending.

Chemical Firms Rank High in NSC Study

The chemical industry is again among those industries having the safest work environment in the United States, according to a study submitted to the National Safety Council Chemical Manufacturers Association.

The industry's standing is second only to that of the textile industry as published in the council's 1986 edition of *Accident Facts*.

Rates are based on the number of occupational illness and injury incidents, days away from work and deaths.

The chemical industry reported 0.32 incidents per 100 full-time employees, an incidence rate only slightly higher than the textile industry's 0.46.

Chemical workers are more than 10 times safer on the job than the average industrial employee, according to Robert Roland, president of the Chemical Manufacturers Association.

Mr. Roland says the annual statistics "have shown the chemical industry to be the safest industry in this country during the last six years."

Incidence rates for industries other than the chemical and textile industries range from 0.65 for agricultural chemicals to 1.76 for the transit industry.

OBITUARY

Hans Stauffer

Hans Stauffer, former president of Stauffer Chemical Company, died at his home in Bronxville, N.Y., on November 14, 1986, after a long illness. He was 65 years old.

Mr. Stauffer, a native of Oshkosh, Wis., joined his uncle, John Stauffer, founder of the company, in San Francisco beginning a 51-year career with the chemical concern.

He came East in 1928, when he was appointed Eastern sales manager. He was a vice-president in 1949 and president in 1964. After retiring in 1967, Mr. Stauffer served for one year as chairman of the executive committee and remained a director until his death.

Under Mr. Stauffer, the company became publicly owned and its headquarters moved to New York. The company grew rapidly through a series of acquisitions and now a part of Chesapeake and Potomac

PERFUMES & FLAVORS

Continued on Page 51

ing of the dollar on international markets," he says.

AROMA CHEMICALS

TERPINEOL — Import levels of terpineol and its ester, terpinyl acetate, have fallen dramatically in the past year. January through August, 1986 totals reached 176,376 pounds, only 36 percent of the total for the same period last year: 489,523 pounds. The decrease has been attributed to the decline in availability of Chinese terpineol.

"The lack of Chinese imports has made the domestic suppliers' position far more favorable," says a US supplier of terpineol. He adds that both the terpineol and terpinyl acetate are in great demand. "The market is tighter as a result and prices are climbing."

Pricing for terpineol had remained constant for over two years when a price increase, reflecting the limited availability of the perfume grade chemical, of almost 40 percent was recorded in late September. Terpineol is now listed at \$1.45 to \$1.50 per kilo, cost and freight New York, up from \$1.05 per kilo, same basis.

ESSENTIAL OILS

BALSAM — Balsam peru and balsam copaiba firmed in the last two weeks as the market experienced delayed Central American shipments combined with dwindling inventories. Spot prices for the balsam peru jumped 50c per pound from \$4.10 to \$4.60 per pound; balsam copaiba shipping prices strengthened 20c per pound to \$1.75 f.o.b.

"Inventories are very limited," says an essential oils broker, citing a steady demand and uncertainty about the upcoming shipments. "Shipments have been interrupted," concurs an importer, "to a large extent by the earthquake in San Salvador." He emphasizes that there is no shortage of material at point of origin, rather an inability to transport what is there.

Source speculate that prices for the balsam peru and balsam copaiba will continue firm while shortages continue. "Until shipments resume, prices will remain higher because what little material is still in stock is sought by many buyers."

BERGAMOT OIL — After a late September firming trend when essential oils sources anticipated a small Calabrian harvest, (CMR 9/22/86 p. 28) bergamot oil has begun to slip. Reports of a strong and plentiful crop clipped away at the high spot prices bringing them down 51c per pound. Shipping prices were affected also, coming down from \$45 to \$44 per kilo cost and freight New York to around \$44 per kilo.

"This is the bergamot oil's harvesting time," says one essential oils broker, "so people have a better idea how much material will be on the market." An essential oils importer adds that "the bergamot crop must have been quite substantial for the prices to drop so quickly."

The essential oils broker emphasizes the fluctuation played a large part in September's firming because it took that many dollars to buy the Italian material.

As a change in the currency market began to take the lira is continuing to strengthen against the dollar. Sources agree that the strengthening must be due solely to reports of the Italian Mediterranean crop.

Recently other possibility, adds one source, "that the Chinese are beginning to make inroads into the international bergamot oil market."

CANANGA OIL — Cananga oil spot and futures prices softened last week in reaction to reports that inventories at point of origin in Java, Indonesia, are building up faster than demand can relieve them. Spot prices fell from \$9 to \$8.75. Shipping prices fell about 50c on the kilo to \$18 to \$19 per kilo, same basis.

"Producers must be accumulating the oil rather than trying to accommodate it," says an essential oils broker. "Supply is simply in excess of demand."

Another source says that the recent devaluation of the Indonesian rupiah has contributed now a part of Chesapeake and Potomac

the devaluation didn't affect most of the exports, he adds, a material suffering from oversupply could have the devaluation "catch up" with it and help to depress the price further.

PAPRIKA — Spanish paprika and oleoresin of paprika spot prices have increased over the last month from 5c to 7c per pound for all grades. The primary reason for this is the amount of damage done to the Spanish crops by three steady weeks of rain. Sources quote from 10 to 15 percent of the crop was destroyed by the loss of field drying crop in the period.

Compound, the problem for US buyers is the weakness of the dollar on the international market. Spanish producers are holding the prices up in light of their quantitative losses and other currencies, such as the Japanese yen, can afford to pay the higher price.

Domestic producers of paprika and oleoresin of paprika are taking advantage of the current Spanish market and lowering their prices to attract disaffected buyers of the Spanish material.

A spice broker envisions continued tightness on the paprika market, noting a slowdown in Spanish processing that has accompanied the rain losses. "If they don't step up the rate of production, there may not be a surge of material available to US buyers."

COATINGS & PLASTICS

Continued from Page 49

santo's new "Butyelite" sheet and captive resin capacity came on line at its Springfield, Mass. plant this Summer, while Du Pont boosted its "Saflex" capacity by 20 million pounds, in two separate plant expansions, one completed in May, the other by the end of October.

With demand strong this year, supplies of resin and sheet have been very tight. Even though producers have been operating plants at full capacity, demand still exceeds capacity, they say.

Worldwide demand for PVB sheeting, three-quarters of the total market, is said to range between 150 million pounds and 200 million pounds per year. The market is growing, particularly in the automotive segment, as laminated safety windshields become the norm abroad. Next year, Japan will require all automobile windows to be laminated, a move which should boost demand, and possibly US export levels.

The US market for PVB is estimated to be around 96 million pounds; between 70 and 80 million pounds of this is sheet, the remainder resin for coatings applications. Within a framework of 4 percent per annum overall growth, the US automotive sheet demand is showing 2 percent growth; in contrast, architectural sheet is growing at 10 percent per year.

Exports currently stand at about 10 million pounds per year; producers feel this number may increase substantially over the next two years to meet heightened demand abroad.

Coatings applications are myriad, producers explain, catering to individual, specialized customer needs; currently, the major areas of concentration are "wash primer" coatings, magnetic wire, marine and corrosion-resistant coatings, flow agents and photomasking applications such as reproductive toners.

Demand for reproductive dry toners, which use PVB as a binder and toughener, have been growing 16 percent per year for the past two years, and are expected to sustain this growth rate over the next few years.

Ceramic binder applications represent one new growth outlet for the resins, which are being used as "green strength" binders in tape casting construction of capacitors and other circuit components.

Prices for the resin, dependent on PVOH (polyvinyl alcohol) prices, were last increased in April and currently stand at \$2.80 per pound. PVB sheet prices have been stable for the past few years, producers relate, at 50c per square foot, for both architectural and automotive sheet grades; specialty sheet grades sell for as high as 80c per square foot.

Producers feel the recent expansions should ease current tightness, and enable them to keep up with growing demand.

POLYSTYRENE — Polystyrene HCL has followed Huntsman Chemical Corporation and

Dow Chemical Company in raising selling prices for its lines of polystyrene by 3c per pound, although the firm has announced a later effective date of January 1.

Huntsman and Dow announced similar increases, with a 2c-per-pound increase for specialty and colored grades, to be effective December 1.

American Petrofina, a division of Cosden Oil and Chemical Company initiated this second round of polystyrene price increases in response to additional styrene monomer price hikes. Petrofina's increase, announced for November 1, will probably be delayed in response to market pressures, a spokesman announced previously.

PLASTICS ADDITIVES

SILICATES — PQ Corporation will raise list and selling prices for its "Q-Cal" hollow silica microspheres by 3 percent effective January 5, the company announced last week.

New truckload prices for "Q-Cal" Grade 200 will be 4c per pound higher, at \$1.44 per pound. Grade 300, also to rise 4c per pound, will be listed at \$1.29 per pound.

The microsphere products are used in a wide range of applications including low density fillers for plastics composites and as sensitizers in explosives.

Sandoz Spill

Continued from Page 9

causing problems similar to the ones in the Hudson River stripped bass fishery (because of PCB contamination).

In France, the authorities have already banned fishing for the next six months in the Rhine and its direct tributaries. Over on the German bank, North Rhine-Westphalia area a water treatment plant is expected to be reopened shortly and drinking water is expected to be taken from the river in Düsseldorf.

In Holland the situation is uncertain as the country gets two-thirds of its drinking water from the river. It was, according to press reports, unclear whether the Dutch would

seek compensation for the accident from the Swiss government or from Sandoz.

A spokesman for Sandoz, M. Fazel, was quoted as saying "It goes without saying that damages were caused by this fire. We are responsible, and there is not a shadow of a doubt that we will take care of it...We feel badly about it, and I would say that we are shocked and saddened by what has happened to us."

Sabic Planning N.Y. Sales Firm

Saudi Basic Industries Corporation, which is ten years old this year, is moving to "decentralize" its sales activities now mainly conducted out of the company's Riyadh headquarters.

Abdullah S. Nofaldi, president of Sabic Marketing, Ltd., the company's wholly-owned global marketing subsidiary, told reporters attending the K-86 plastics and rubber trade fair in Dusseldorf, West Germany, that the company will create new sales companies in London, the site of an existing Sabic office, and in New York. It had been expected that the company would set up its US sales base either in New York or in Houston.

He said the companies will, in effect, move key sales functions closer to existing and potential customers, as well as established distribution centers around the world.

Mr. Nofaldi notes that Sabic has completed its first-generation projects and is now concentrating on optimizing the efficiencies of existing plants, developing downstream projects, developing new grades of existing products and implementing plans for a research and development facility.

The company started production at a new downstream VCM/PVC plant recently and has introduced a new hexene-comonomer, high alpha-olefin formulation of polyethylene.

Sabic's affiliates now produce more than 20 distinct products in nearly 100 different grades, he says, and these are marketed to some 2,000 customers in 60 countries.

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CHEMICAL PROFILE

SODIUM TRIPOLY

November 17, 1986

SUPPLY

PRODUCER	CAPACITY*
FMC, Carteret, N.J.	85,000
FMC, Green River, Wyo.	150,000
FMC, Lawrence, Kan.	100,000
FMC, Newark, Calif.	120,000
Monsanto, Augusta, Ga.	87,500
Monsanto, Carondelet, Mo.	80,000
Monsanto, Long Beach, Calif.	80,000
Monsanto, Trenton, Mich.	80,000
Occidental, Dallas, Tex.	80,000
Occidental, Jeffersonville, Ind.	80,000
Olin, Joliet, Ill.	175,000
Stauffer, Chicago, Ill.	25,000
Total	1,102,500

*Tons per year of sodium tripolyphosphate. Capacities are somewhat variable, depending on the density of the material produced; most facilities make other phosphates as well. FMC is expanding its Green River capacity to 250,000 tons per year by the end of 1987 and is reducing output at Carteret to mainly food grade STPP. Monsanto completed the closure of its 120,000-ton-per-year Kearney, N.J., plant in the third quarter of this year. Stauffer has 80,000 tons per year of capacity idle at Morrisville, Pa. Profile last published 4/1/84; this revision, 11/17/86.

DEMAND

1985: 610,000 tons; 1986: 610,000 tons; 1990: 595,000 tons.

GROWTH

Historical (1976-1985): Minus 1.5 percent per year; future: minus 1 to 0 percent per year through 1990.

PRICE

Historical (1952-1986): High, technical, \$39.50 per cwt., bulk, f.o.b., freight equalized; low, \$6.50 per cwt., same basis. Current: \$37.50 per cwt., same basis.

USES

Home laundry detergent builder, 52 percent; industrial and institutional detergents, 21 percent; dishwashing detergents, 16 percent; food uses, 4 percent; miscellaneous, 2 percent; exports, 5 percent.

STRENGTH

Renewed emphasis on powder detergent marketing this year is giving tripoly a push on supermarket shelves. Reformulation is boosting tripoly content in phosphate-containing detergents. Modernization and the closing of high cost plants is trimming production expenses for the industry.

WEAKNESS

Non-phosphate liquid laundry detergents continue to encroach upon STPP markets, although at a slower pace, and now command 30 percent of the home detergent business. Imported tripoly, accounting for about 5 percent of the market, has had an effect on pricing.

Continued on Page 71

PLATFORM

Anderson on Insurance

The following is an excerpt from a speech on the liability crisis given by Union Carbide's Warren Anderson before the recent annual meeting of the National Association of Casualty & Surety Executives.

Although Union Carbide has been actively involved at both the state and federal level on the tort reform issue, this is my first time at bat on the subject in a public forum. But a lot of business speakers have preceded me, and someone said we could fill the mall at the Washington monument and still not get a product liability reform bill out of Congress. And the reason is not hard to understand — it's mainly that the plaintiff's bar, and the consumerist groups that oppose business on this and most other issues, could fill the mall, Pennsylvania Avenue, and R.F.K. Stadium.

That's the kind of risk calculus a lawmaker understands.

Where do we go from here? As you know, there is some progress on the issue in the various states.

Some, like California, Washington, and Connecticut have moved boldly in an effort to curtail abuse of the system. Others, the experts say, have left loopholes big enough to make their reforms all but meaningless.

What the states do seem to agree on is a belief that a piecemeal approach to the problem will not succeed.

A policy statement adopted last month by the National Governors Association said in part, and I quote, that "the issue of product liability reform has increasingly pointed to federal action as a way in which to alleviate the problems faced by product manufacturers with regard to inconsistent state product liability laws."

The statement goes on to say that "this lack of uniformity makes it impossible for insurers to predict accurately the potential liability of a product. Clearly," the governors say, "a national product code would greatly enhance the effectiveness of interstate commerce."

Hope springs eternal, and perhaps the next Congress will see fit to do the job its predecessors have neglected. If it does, what kind of system can we hope for?

I will leave the details to the legal scholars and experts, although I would nominate four reforms as crucial to increasing the predictability of the system:

I think any reform measure should deal with the question of joint and several liability. I see no rational reason for a defendant with only marginal involvement in an accident to be stuck with the whole judgment.

Municipalities in particular are up in arms over this, and with good cause.

Second, awards for pain and suffering — the non-economic damages — should be subject to some limit. Punitive damages should

also be limited — in amount and for conduct that is truly willful or reckless. As things stand now, a jury could award a plaintiff \$5,000 or \$5 million without any rhyme or reason for the difference.

Third, there ought to be a sensible collateral source rule. The rule says you can't show that a plaintiff recovered expenses from one other source, and that you can't deduct the payment from this recovery. But if a plaintiff has already recovered his legitimate losses why should the defendant have to provide him with a profit?

And fourth, manufacturers need a defense of the art defense. Without one, a manufacturer can be liable for a risk he could not have known about or anticipated when he introduced the product.

Some of the states have moved in this direction, but we need the same rule in all states that manufacturers and insurers can have some confidence that they will not be liable for something scientists may discover 10 years from now.

Basically, we ought to work toward a system that can tell us either that someone is liable or he isn't. The system we have now can take the same evidence and reach a conclusion, with any number of gradations between.

Neither a business nor its insurer cannot reasonably operating or financial decisions when liability is a wild card.

Here's my own view of what liability should mean:

I think corporations should pay their individual share of losses where they did something wrong that caused the loss.

I think that doing something wrong implies that there was at least some negligence. It should mean failure to apply the edge in existence at the time a product is made, or at least some failure to meet industry requirements.

The return to a fault based standard liability was also at the top of the list of recommendations at the 1986 White House Conference on Small Business. It took precedence over other issues ranging from taxation, to regulation, to international trade.

Finally, I think expert testimony should be taken only from those people whose qualifications are well recognized by their profession.

These few rules would go a long way toward making the system clear, fair, and predictable, which would go a long way toward ending the lottery. But what would get in return?

We would have a civil justice system of all of us can understand. And it might be one that commands our respect, and reflects not only the deep desire of Americans for fairness, but our need for rationally based system that so profoundly affects our lives and our future.

JOBS & PEOPLE

Grow Group Elects Manager and V-P

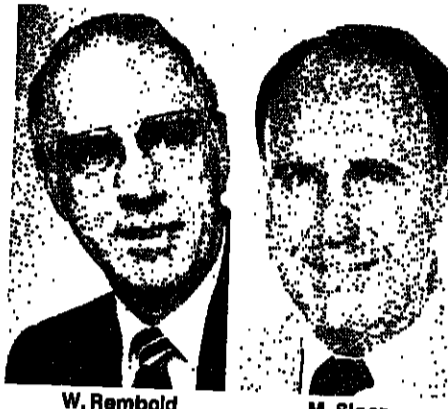
Grow Group Inc. has appointed William H. Rembold manager of operations for Devoe Marine Coatings Company and Michael G. Sloan vice-president for the Western Division of Marine Coatings Company and Devoe Napko Protective Coatings, divisions of Grow Group Inc.

Mr. Rembold will be responsible for all operations at the Riverside, Calif. and Pennsauken, N.J. plants. Prior to his appointment as manager of operations, he was manager of distribution for Devoe Marine.

Mr. Sloan will be responsible for all marketing, sales and technical services for both Devoe Marine and Devoe Napko in the Western United States, including Alaska and Hawaii.



Stuart R. Macconchie, who has been appointed deputy regional manager in Europe for the R.P. Scherer Corporation. Mr. Macconchie will be regional president in Europe, Scherer's largest geographic operating unit, on April 1, 1987.



W. Rembold and M. Sloan have joined Haarmann & Reimer Corporation as account executive in the Aroma Chemicals Division.

ROBERT S. HSU has been appointed senior research associate in the chemical research department of Hoechst-Roussel Pharmaceutical, Inc. CHARLES S. RIGBY has been elected national sales manager in the Specialty Chemicals Division of Velsicol Chemical Corporation. KENNETH E. JONES has been named operations supervisor at the Andrews, S.C. production facility of M&T Chemicals Inc.

ROBERT L. CRESPO has been appointed assistant treasurer of Witco Corporation. JOHN E. AIKEN has been named sales agent for the Canadian provinces of Quebec and Ontario at Ferro Corporation's Bedford Chemical Division. WILLIAM J. LUDLUM

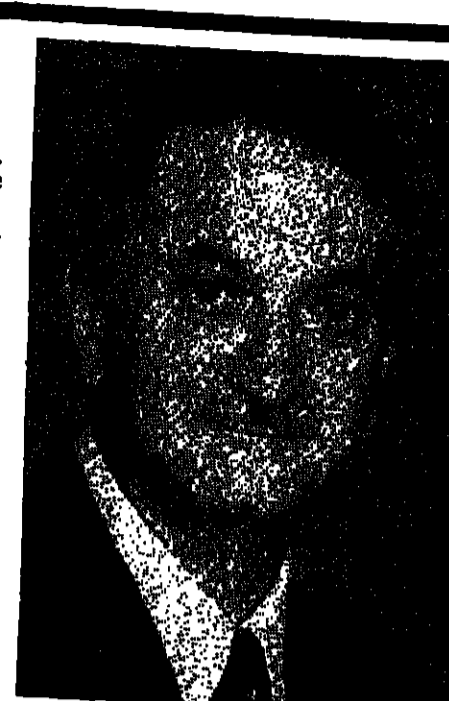


R.S. Hsu and C.S. Rigby



K.E. Jones and R.L. Crespo

DONALD R. LEHMAN has been named director of business services and operations at the Portsmouth, Va.-based subsidiary of Celanese Corporation, Virginia Chemicals. FRANK A. TELESKA has been appointed to



Joseph F. Ragusa, who has been appointed vice-president and regional manager of the Southeast and South Central regions for Thompson-Hayward Chemical Company. Mr. Ragusa will be responsible for all branch locations in the Southern half of the United States.

the newly-created position of venture manager for pool products at the Chemicals Group of Olin Corporation. JOHN A. NIKLES has joined Crowley Company of New York as Midwest manager of sales and product development.

R. BARNES PARSONS has been named general manager and vice-president of health sciences marketing and JACK W. LOWE has been appointed director of international marketing at Eastman Company. SARAT CHANDRASEKHARAN has been named marketing manager for automotive adhesives at Ciba-Geigy Corporation. FRANK GIAMBRONE has been appointed



J. Aiken and W.J. Ludlum

Air Products Names Two New Managers

Air Products & Chemicals, Inc. has appointed Daniel M. Buck business manager of "Airopak" container systems and Kenneth J. Kallish sales manager for "Airopak" containers.

Mr. Buck will manage Air Products' efforts to manufacture and market solvent-barrier plastic containers and automotive fuel tanks.

Mr. Kallish will be responsible for organizing the sales of "Airopak" containers throughout North America.



D. Buck and K. Kallish

general manager of La Prairie and ARNOLD PACHTINGER has been elected senior vice-president of sales both of Jacqueline Cochran, Inc. KEN RICHARDS has been



D.R. Lehman and F.A. Telesca

named manager of specialty sales at Southern Talc Company. JAMES E. HALL has been appointed national sales manager for Lancy International, Inc. JAMES A. TICHICH has been named plant manager in Dallas for Ashland Chemical Company's Electronics and Laboratory Products Division.

MEETINGS CALENDAR

November 17, 1986

THIS WEEK

CHEMICAL MANUFACTURERS ASSOCIATION, chemical industry conference, Palmer House Hotel, November 17-18, Chicago, Ill.
DRUG, CHEMICAL & ALLIED TRADES ASSOCIATION, Fall luncheon, Waldorf-Astoria Hotel, New York, November 19.
EUROPEAN PETROCHEMICAL ASSOCIATION, international transport seminar, Frankfurt Sheraton Hotel, Frankfurt, West Germany, November 20-21.
FERTILIZER ROUND TABLE, Sheraton Inner Harbor Hotel, Baltimore, Md., November 17-19.

THIS MONTH

LATIN AMERICAN PETROCHEMICAL ASSOCIATION, sixth annual meeting, Rio Palace Hotel, Rio de Janeiro, Brazil, November 23-25.

DECEMBER

CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION, 73rd annual meeting, Marriott's Harbor Beach Resort, Fort Lauderdale, Fla., December 7-11.
NATIONAL ASSOCIATION OF CHEMICAL DISTRIBUTORS, 15th annual meeting, Ritz-Carlton-Naples Hotel, Naples, Fla., December 2-6.
SALES ASSOCIATION OF THE CHEMICAL INDUSTRY, annual Christmas party, New York Hilton Hotel, New York, December 16; education committee, seminar, "The Psychology of Selling," Treadway Inn, Saddle Brook, N.J., December 18.

LATER ON

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, center for chemical process safety, international conference on chemical safety issues, Omni Shoreham Hotel, Washington, D.C., February 3-5.

ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS, 12th annual Spring workshop and exhibition, Skyline Ottawa Hotel, Ottawa, Ontario, Canada, April 27-30.

CHEMICAL MARKETING RESEARCH ASSOCIATION, Houston Meeting: "The US Chemical Industry Responding to Change," Westin Galleria Hotel, Houston, Tex., February 4-5, 1987.

CHINACHEM '87, international exhibition on chemical and petrochemical industries, China International Exhibition Center, Beijing, China, April 3-9.

CHLORINE INSTITUTE, winter meeting, Mayflower Hotel, Washington, D.C., March 15-19.

DRUG, CHEMICAL & ALLIED TRADES ASSOCIATION, 61st annual dinner, Waldorf-Astoria Hotel, New York, March 18.

FERTILIZER INSTITUTE, 1987 annual meeting, Marriott Orlando World Center, Orlando, Fla., February 1-3.

INSTITUTE OF GAS TECHNOLOGY, 14th annual symposium on energy from biomass and wastes, Hotel Royal Plaza, Wall Disney World Village, Buena Vista, Fla., February 2-5.

INTER-SOCIETY COLOR COUNCIL, scientific confer-

ence, Williamsburg Lodge, Williamsburg, Va., February 8-11.

NATIONAL PETROLEUM REFINERS ASSOCIATION, 86th annual meeting, Convention Center, San Antonio, Tex., March 29-31; 12th international symposium on plastics, Convention Center, San Antonio, Tex., April 5-7.

POLYURETHANE MANUFACTURERS ASSOCIATION, Spring meeting, commercial development of castable systems, Fairmont Hotel, Dallas, Tex., 26-29.

SOAP AND DETERGENT ASSOCIATION, 44th annual meeting and industry convention, Boca Raton, Fla., January 28-February 1, 1987.

SOCIETY OF THE PLASTICS INDUSTRY, 40th annual conference of the reinforced plastics and composites institute, Cincinnati Convention & Exhibition Center, Cincinnati, Ohio, February 2-4.

THE FERTILIZER INSTITUTE, 1987 annual meeting, Omni Orlando World Center, Orlando, Fla., February 1-3, 1987.

BUSINESS BRIEFS

AMOCO PERFORMANCE Products, Inc. has moved into new quarters in Ridgefield, Conn. this Friday (November 21). The organization was formerly Union Carbide Corporation's engineering plastics group, headquartered in Danbury, Conn. Amoco acquired the group earlier this year. The company's high-performance plastics include polysulfone, polyethylene sulfone, polyarylate, polyketone and other resins for a wide variety of end-use applications.

ARLICKS INCORPORATED has named Chemical Corporation, Akron, Ohio, as distributor for key peroxide and peracetic acid products to the rubber industry in the Rocky Mountains. Harwick represented Hercules in the Western states over a decade. Hercules will continue to support the rubber industry by supplying technical assistance, when needed, from its Wilmington, Del. office.

WILLCOX, INC., Wilmington, Del., has been awarded a license to transport liquid and dry-

bulk commodities between the US and the Province of Ontario. Operating authority for the trucking company to carry bulk commodities from and to points in Ontario comes after more than a year of proceedings and testimony from shippers and others carriers. Matlack is committed to a two-year business plan which includes operating a facility in Canada and hiring necessary sales, terminal and driver personnel to service the area.

MEDIAN DIAGNOSTICS, Inc., Cincinnati, Ohio, has finalized a licensing agreement with the University of Arizona which allows the company to produce the first test kit utilizing monoclonal antibodies to detect *Cryptosporidiosis*. The parasite, found occasionally in healthy individuals, is a serious complication in patients with acquired immune deficiency syndrome (AIDS), resulting in a life-threatening loss of fluids.

MINNETONKA CORPORATION, Minneapolis, Minn., will distribute and market a

product of hair-thinning treatment developed by Crinos Industria Farmacobiologica, SpA, Como, Italy. The product, called "Foltene," has been marketed in Europe for over five years and grew out of Crinos' research on one of its major drug products, "Ateroid," for arteriosclerosis. Recent announcements of hair treatment products resulting from cardiovascular research include Upjohn Company's "Rogaine" and Lederle Laboratories' "Viprostol."

NATIONAL SCIENCE Foundation says private industry spending for research and development is expected to grow approximately 5 percent during 1987 to nearly \$80 billion. This is down from the average annual growth rate of 13 percent during the previous ten-year period. Poor sales expectations in durable goods, concerns about short-term profitability and the need to restructure R&D efforts after corporate mergers, are cited as reasons for the modest increase. The electrical equipment industry plans the

largest average annual increase from 1985-1987 — 10 percent — followed by chemicals and aircraft at 8 percent each.

PETROLITE CORPORATION says it has a new patented water treating product called "Vector" VS-3080 that can provide effective dispersion as well as scale inhibition in both high-temperature process systems and conventional cooling water systems. Described as a unique organic liquid, Petrolite says the product's high thermal stability — up to 360 degrees Fahrenheit — permits full system protection even under upset conditions.

ROHM AND HAAS Company is offering a new eight-page brochure describing the company's "Paraloid" impact modifiers and processing aids for polyvinyl chloride packaging applications. The lines contain products specifically designed for production of clear or opaque bottles, clear or opaque sheet and film, injected molded parts and interior profiles. All are FDA approved, the company says.